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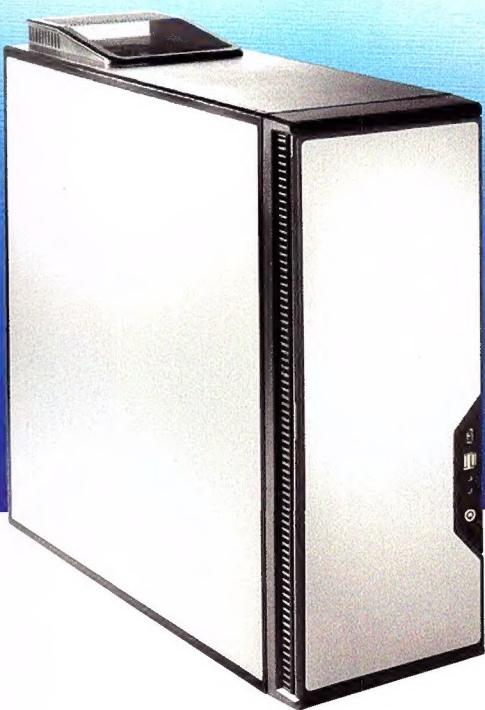
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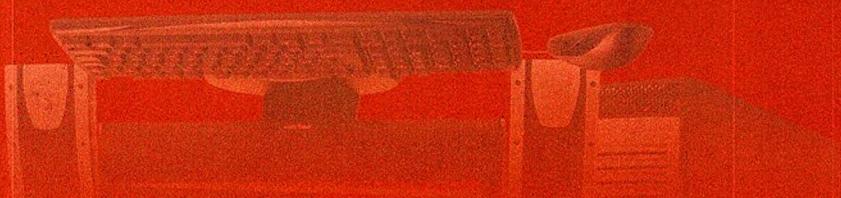
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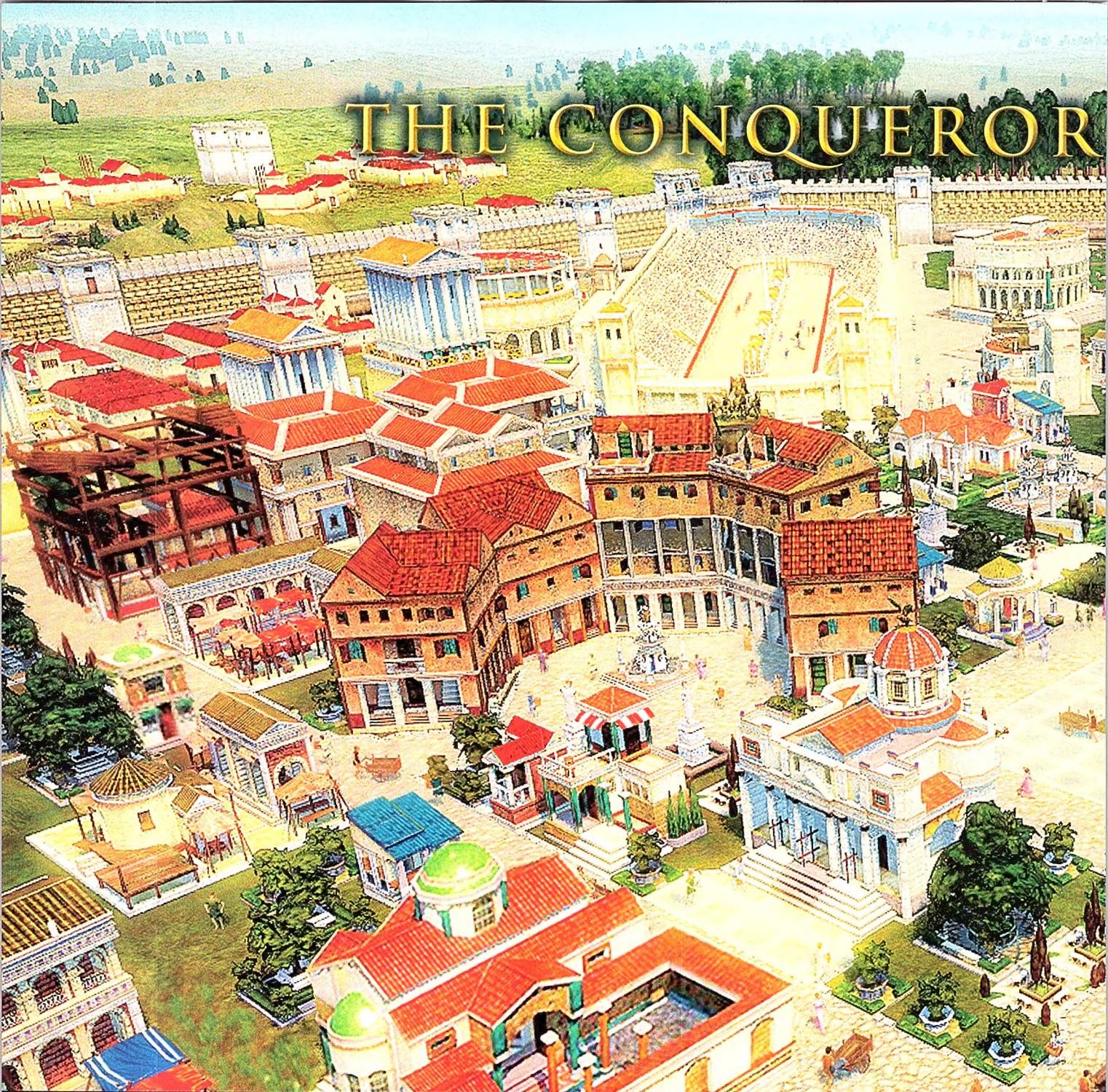


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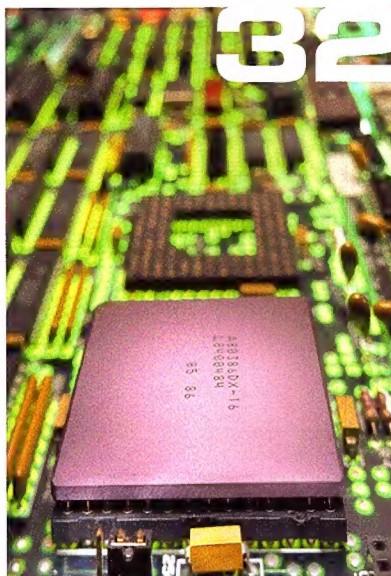
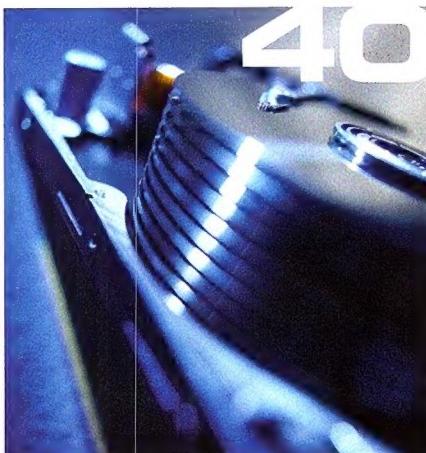
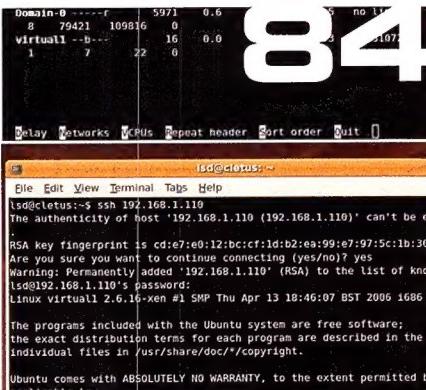


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## atomic LIVE FORUM Computing + Tech in 2010

Melbourne, Monash University Caulfield Campus, 28 September

That's right, Melbournites! *Atomic* is holding a special event at Monash University, where you'll have an opportunity to hear the future of computing from people in the know. Michael Aphorpe of AMD, Microsoft's Norbert Haehnel, Simon King from Samsung and representatives from ASUS will be there to talk shop and give you the inside info on upcoming tech.

All attendees will receive a gift bag and there will be spot prizes from the aforementioned vendors throughout the night.

But you'll have to register to come! It's free, so just visit [www.atomicmpc.com.au](http://www.atomicmpc.com.au) for more details.

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## EDHEAD

**Change log**

Stop. Yes, you.

Flick through the rest of the magazine. Quickly now. What does it say to you?

I'm hoping you'll answer 'Buy me!' or something equally financially positive, but I'll settle for 'Techtastic!' or 'So good I got wood.' Don't worry – we get just as excited when we peruse the lovely pages of *Atomic*.

During your flickage, you might well have noticed a few changes to the mag. Okay, there's more than a few. I'll try to round up most of it here, so you have some idea of what to expect when you further investigate the depths of this issue.

For one, we've consolidated all our news pages and whacked them into the front of the magazine. For some time we've noticed a lot of clashing with Update, our general news page and Tech Trends, our hardware news page, so we decided to take all the good bits of the news sections and transform them into four pages of compressed fun. It's tighter, more informative, and gives us more pages for – reviews!

Yes, we have basically doubled our number of review pages, to give you more content for your cash. This includes a new section in Gameplay for 'game' hardware reviews, for products like dedicated gaming keyboards, mice, monitors, speakers... whatever we feel needs a bit more than a few words in Gearbox.

With Kitlog well established, there didn't



The first ever Core 2 Duo laptop! GeForce 7900 GTX, 2GB RAM and a 2GHz CPU. Read all about it on page 49!



seem much point in Framerate – so it's been banished as well. Don't worry, we're looking to bring back its graphy goodness, so keep your eyes peeled for that.

Culture Shock has grown an extra page and Kate Inabinet now has a gaming opinion page all to herself due to popular demand. Speaking of gaming, all our game reviews will go the extra mile – not only supplying a quality review, but interesting tidbits, tweaks and other assorted stuff you won't get anywhere else.

We've also done away with the fixed tutes of Windows, Linux and Hardware so Technique can really stretch its legs. Expect quite a variety of tutorial topics over the coming months – everything from .NET development to Mac OS X tweaking.

And that's just the start.

Now for this month's content. In the following pages you'll find an easy DIY guide to silencing your PC, along with the scoop on the GPGPU movement. Craig has also gone bananas with a bunch of hard drives and Free Radical's HAZE has been exposed for the world to see. Ashton rips open trojans and finally, there's the last bit of Leigh Dyer's excellent Uber Linux box.

**Logan Booker**

[lbooker@atomicmpc.com.au](mailto:lbooker@atomicmpc.com.au)

To see the latest *Atomic* competitions, visit [www.atomicmpc.com.au/competitions](http://www.atomicmpc.com.au/competitions). The closing date for entries is 11 October 2006. Winners will be announced in *Atomic* 71.

**Atomic** 67 winners: 6x copies of GTR 2 + 1x Logitech MOMO Steering Wheel Q: In what year did F1 driver Ayrton Senna leave McLaren for Williams-Renault? A: 1993. J. Gower, Sunrise Beach QLD (game and wheel); C. Everingham, Seaford SA; R. Hansford, Mooroolbark VIC; G. Jones, Hillarys WA; M. Terry, Mortdale NSW; D. Nash, Cronulla NSW. Tintin volumes 4, 5 & 6 Q: What is the full name of the Belgian artist that created Tintin? A: Georges Prosper Remi. G. Mercon, Coorparoo QLD.

**Terms and Conditions of Entry.** 1. The promoter is Haymarket Media of 52 Victoria Street, McMahons Point, NSW 2060. Promotion period is from 9.00am on 13.09.06 until 12.00pm on 11.10.06. 2. Entry is open to residents of Australia and New Zealand. Management and employees of Haymarket Media and their immediate families, and any advertising, marketing or promotional firms associated with this promotion are not eligible to enter. 3. Enter by posting or emailing forms to Haymarket Media. 4. The draw will be held at the offices of Haymarket Media at 5.00pm on 11.10.06. Winners will be notified by mail and published in *Atomic* 71. The prizes are not transferable or exchangeable. 6. The judges' decision is final and no correspondence will be entered into. 7. The promoter reserves the right to publish the winner's name and suburb for promotional purposes. 8. All entries will become the property of Haymarket Media.

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**Editorial and product submission:** *Atomic* welcomes all information on new and upgraded products and services for possible editorial coverage. However, we respectfully point out that the magazine is not obliged to either review or return unsolicited products. The Editor welcomes ideas for articles, preferably sent in outline form, with details of the author's background and a few samples of previously published work. We cannot accept responsibility for unsolicited copy and stress that it may take some time for a reply relating to these submissions to be sent out.



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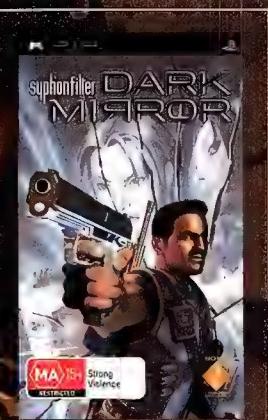
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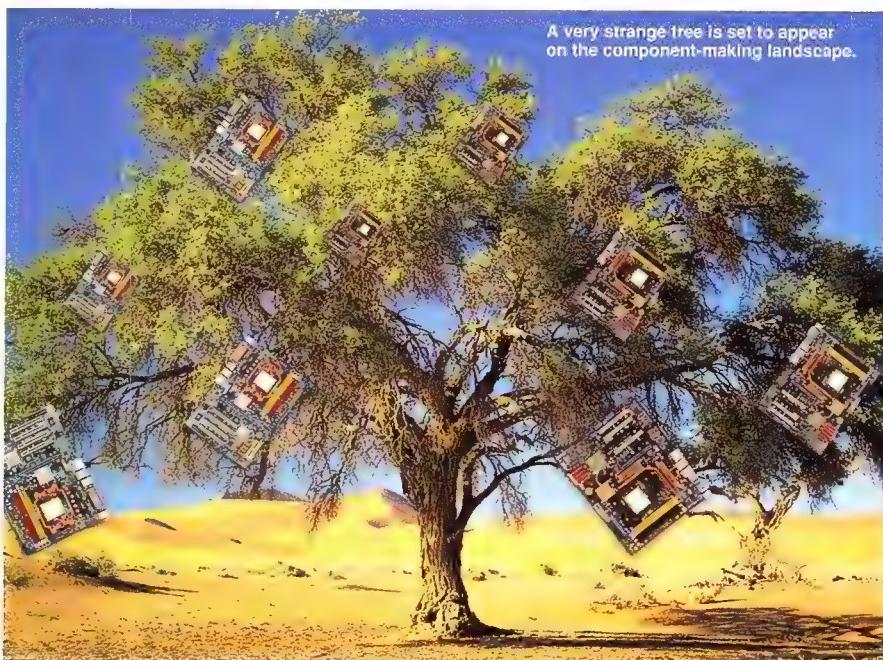
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# ASUS and Gigabyte sitting in a tree...

**Craig Simms** explains why the big'uns are getting together.

The two most recognised tier one manufacturers in Taiwan have gotten together, seemingly to fend off the Foxconn threat by announcing a joint venture. An as of yet unnamed company will be formed between the two, with Gigabyte taking a 51 percent stake and ASUS the rest.

The new entity will be set up with a relatively small amount of capital – \$320m. Don't expect to see the new company's name splashed anywhere though – it'll merely be the controlling party. The Gigabyte/ASUS brands and markets are still very strong, and it would make little sense to throw away that heritage.

For ASUS it's not about a controlling interest – it's about having its fingers in as many pies across the market as possible – diversity being one of the tenets of good business. It already owns the budget brand ASRock, as well as a significant interest in a number of smaller companies in other markets – allowing ASUS to reap financial benefits without having to manage the companies or face restrictive anti-competition laws. The agreement with Gigabyte simply expands on this.

For Gigabyte it's all about increasing market share, increasing brand power and raising profits on the already razor-thin margins on motherboard and video card production.

Only motherboards and video cards will be covered under the deal, with manufacturing outsourced to Gigabyte, and the Gigabyte brand licensed by the new entity. Coolers, cases and everything else stay with their respective companies.

IP will not be shared between the two companies, and they will continue to function separately. ASUS motherboards will still be made in ASUS factories, although Gigabyte now has access to those same factories.

Despite the agreement, expect competition between the two companies to remain fierce, as they continue to battle for market share – which can only be a win for the consumer. Despite comments to the contrary, the main purpose most likely is to cut the legs off Foxconn by removing any manufacturing dependencies on them.

The new entity is expected to start trading

**'Expect competition between the two companies to remain fierce.'**

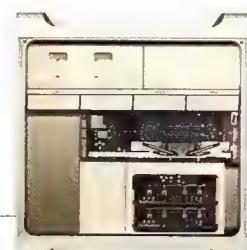
in 2007. Nevertheless, ASUS has previously announced that it will split its retail and OEM arms in about 2008, meaning that Gigabyte could potentially take on ASUS's OEM load while it continues in its quest to become the next Sony. Of course this is entirely speculation, and as usual we'll have to wait to see whether or not it comes to fruition.

Bit by bit the market is getting smaller, as players consolidate in an attempt to stave off threats from bigger companies, or simply to gain more ground. It will be fascinating to watch where the alliances are made and where the lines are drawn as the heavyweight internationals prepare to duke it out.

## SHORT CIRCUITS

**Apple has released its workstation level 'Mac Pro'**, featuring two tasty dual-cored Xeons, based on Woodcrest. The usual Apple quality engineering is present in the case, as it is with its refreshed Xserves

– its 1U rack servers, now in Intel form. Apple also showed off OS X 10.5 recently,



which featured a filesystem history called 'Time Machine', so you can pull old or deleted files from oblivion with ease. Virtual desktops are in (although in AppleSpeak they're called 'Spaces'), as is the official release of Boot Camp. Expect it in Q2 of 2007.

**It has been reported that the next-gen GPUs** will suck down about 175W to 200W of power. We figure AMD is trying to rectify the situation on the ATI side, could Intel please lend NVIDIA its Conroe engineers?

**LG has shelved** plans for a hybrid Blu-ray/HD-DVD player, and has reverted completely to the Blu-ray camp. This format war needs some serious government intervention.



**Sony has exited the plasma TV market**, sounding a death knell for the technology. LCDs are the flavour of the month, until SED comes in, hopefully by year's end.



## eGame On

**Games and expos always seem to go together.**

If you happen to be in Melbourne on the 17th, 18th or 19th of November, you might feel inclined to pay eGames a visit.

What's eGames? It's a big entertainment and gaming expo to be held at the Melbourne Exhibition Centre. Although it's the event's inaugural outing, it already has the support of numerous manufacturers, developers and major retailers.

eGames will provide companies with a forum in which to discuss their products.

For budding game developers, eGames will provide a place in which to get their foot in the door and sniff out prospects.

The expo will also play host to the launch of the Australian Video Games Awards. Interactive voting leading up to the expo will determine the winners, which will be announced at the show.

Best of all there will be a modding competition, to be judged by *Atomic* editor Logan Booker.

Now that's what we call super exciting.

Organised by Australasian Exhibitions & Events and CyberActive Media, there is plenty of experience behind it, with AEE having been in the exhibition industry for more than 25 years.

If you'd like to know more, check out the Website at [www.egamesexpo.com.au](http://www.egamesexpo.com.au).

## 12 little patents...

**Craig Simms looks up the latest patent battle involving Microsoft... and Nintendo?**

**A**nother patent litigation hopeful, Anascape, has sued Microsoft and Nintendo for infringing on 12 patents regarding its controllers, mostly focused on the basic concepts of analog functionality. If an injunction isn't met, it is hoping for a compulsory licensing fee. Curiously, missing from the list of defendants is Sony, who with Microsoft faced a suit involving the vibration functionality of its controllers from Immersion earlier in the year. Microsoft settled quickly, whereas Sony took it straight to court.

**Microsoft is pulling another leaf out of the Apple book**, by shipping the 'Windows Vista Industrial Design Toolkit', in an effort to get PC case makers to make more attractive cases. These designs are intended to resonate with Vista's design ethos. Reaction so far has been mixed, but we're sure that at least one Aero Glass case will be made.

**Plextor has released the 'PlexEraser'**, an ODD designed to destroy data on recordable discs. It takes three minutes to kill

Immersion however wasn't just interested in the controllers, citing the PlayStation itself and 47 of the console's titles as infringers. May 2005 saw Sony lose out to Immersion, and the consumer electronics giant was forced to cough up US\$90.7m (\$119m). An appeal by Sony was slapped down, forcing the company to cop it sweet. Perhaps Anascape with its case has overlooked Sony in the hope that it will increase its money grabbing chances by targeting those less likely to engage in a long legal battle.

a single layer disc, and double that for a dual layer disc, with security conscious firms being the focus. We would argue that you could just buy nasty cheap media and have it completely unrecoverable after three months anyway, or just take scissors to disc and do it the old-fashioned way.



## FUTUREPROOF

Gazing into the crystal ball of tech

### Rise of the Ballbot

What's a ballbot? Well, it's a robot that has a single wheel at the bottom, and instead of using a standard steering system, it uses a gyroscope to move in a spherical motion. It's a bit like a Segway, but instead of two wheels, it has one.

The ballbot is an interesting concept, and it's something that's been around for a while now. It's a robot that's able to move in a spherical motion, using a gyroscope to control its movement. The ballbot has two small wheels, two of which are being forced and idle, designed to push against the ball to provide traction for the other two, which are powered by high-torque DC servomotors and provide the actual motion. An Inertial Measuring Unit, or IMU, inside the robot calculates a gyro and the robot's position, so it can sense that it's moving such as by rotation and movement. Using this data, the robot can calculate the speed and direction of each wheel, allowing it to perform more complex movements.

It's currently being developed by a team of researchers at the University of Michigan, who are working on improving the ballbot's performance and stability. They are also exploring the potential applications of the ballbot, such as in search and rescue operations, and even as a personal mobility device. The ballbot is a fascinating piece of technology, and it's sure to revolutionize the way we think about robotics.



### POST OF THE MONTH

#### Rewarding the best stuff from the *Atomic* forums!

Everyone on *Atomic* has some sort of special superpower. Emperor\_Matej\_1 is the Law Talking Guy. He's also a cracking debater, and is now a two-time winner of *Atomic*'s ultra-prestigious POTM.

EMI uses his smarts for the common good, and many times he has stepped in and helped Atomicans in their floundering mists of confusion.

Recently he banged up a general-purpose law guide that we think is made of the good stuff. So good, that not only is it POTM, but we're moving it to Classic Threads too.

*Obtaining Legal Advice/Solving a Legal Problem*  
[www.atomicmpc.com.au/forums.asp?s=1&c=1&t=89893](http://www.atomicmpc.com.au/forums.asp?s=1&c=1&t=89893)

Bless you EMI, we're glad you're on our side! Hope you enjoy your new-new Logitech G5!

 Every Post of the Month wins a fabulous Logitech mouse from the brilliant people from Logitech... Huzzah!!!!





**There's nothing like E3...  
not even E3 anymore.**

## E3 is dead

**Craig Simms mourns the death of gaming's largest event.**

**M**onday, 31 July 2006, it was revealed that major exhibitors had pulled support from the Electronic Entertainment Expo, which had a run-on effect to other publishers and vendors as rats fled the apparent sinking ship.

According to reports, companies believe more focused events (read: their products only) would be more beneficial than the expensive and time consuming spectacle that is E3 – and considering they were the ones essentially paying for E3 by having booths there, their word was final.

E3, being a big trade show, also dictated artificial release schedules, as companies wanted finished or polished enough products for show. The reduced commitment will likely mean more sensible deadlines for development teams.

Douglas Lowenstein, President of event

organisers ESA, stated that it was 'no longer necessary or efficient to have a single industry "mega-show"'.

The investing companies want a larger number of private, single-company shows. This would reduce the whole 'winner of E3' mentality that has existed since the beginning of the expo, and focus the press on a particular product at a time of year of the exhibitor's choosing. In short: sanitised, controlled and boring.

ESA is putting on its smiling face and attempting to press on, saying that E3 will live, simply in a 'more intimate' incarnation.

The new event, tentatively titled the 'E3 Media Festival' has moved from May to July, will be comparatively low-cost for participants, and hence will likely be at a cheaper venue. A target audience of 5,000 is expected, over

10 times less than for previous years. No news yet as to who exactly will participate, but you can bet the number of journalists flying in and the subsequent coverage will be greatly reduced.

In the meantime, other shows are picking up the slack. Penny Arcade's PAX seems to be where all the hope is placed after last year's success, with media sites giving it the same kind of exposure usually given to E3. While it was at it, Penny Arcade also announced a new game. Yahuh. Penny Arcade, the game.

**'The future in short: sanitised, controlled and boring.'**

Even Australia is getting in on the action with a trade show called 'GO3', running in the Perth Convention Exhibition Centre in March of next year. Audaciously it's even billing itself as an 'Electronic Entertainment Expo'. It still seems to be in the process of setting up though, as the exhibitor list is 'under construction'.

Whether or not any one show will succeed in becoming the de facto E3 is doubtful, and we may be simply relegated to standard press launches. And that, dear readers, is a shame.



## SHORT CIRCUITS

Liked Homeworld but desperately sought a more personal gaming experience? Then give Star Wolves 2 a go. ([www.starwolves2.de/downloads.html](http://www.starwolves2.de/downloads.html)). This recently released demo reveals a very Homeworld-like engine with graphics to suit, and gameplay that mixes RTS, RPG and space sim. A very tasty combo.



**FEAR Combat**, a new game that will feature just the multiplayer component of the original Monolith-developed title, is now a free download, as of 17 August. It's filled to the pistol clips with 10 gameplay modes, 19 maps and 12 weapons, as well as Punkbuster and mod support.

All you need to do is grab a keycode and the download and away you go. It even plays nice with the retail version.

**John Carmack** has stated that id's next title will be a departure from the Doom, Quake and Wolfenstein titles, in his recent keynote address at this year's QuakeCon. Carmack also mentioned in the same speech that the engine behind the game would fully support multi-core processors on both PC and console and that it is being developed simultaneously for Xbox 360 and PC.

No further details on the new game were mentioned. Got plot?



# I'm a mighty hero

**Logan Booker** fireballs his way through multiplayer  
**Dark Messiah: Heroes of Might and Magic.**

By now, gamers the world over will have given the singleplayer demo of Dark Messiah: Heroes of Might and Magic a very thorough play-through. If you happen to be one of those who did give it a try, you're probably eager to hear news of the multiplayer. Lucky for you, we had a chance to sit down and check out exactly what it's like.

A few weeks ago, Ubisoft treated much of the gaming press in Australia to a night of team-based MP of this Source-based first person shooter. Although some might be quick to compare it to Oblivion, Dark Messiah attacks a more action-oriented audience and while it does provide an RPG component, it's really quite lightweight. Oblivion also (without modification) has no multiplayer element, which Dark Messiah capably addresses.

Anyone who has played the old Quake mod Fantasy vs Future (or FvF as it was known back then) will be instantly familiar with Dark Messiah's multiplayer. Like FvF, you're required to pick a side – in this case the Humans of the Undead – and one of five classes – archer, knight, assassin, priestess or mage. A skill tree then presents itself when you spawn and once you've killed a few opponents and captured

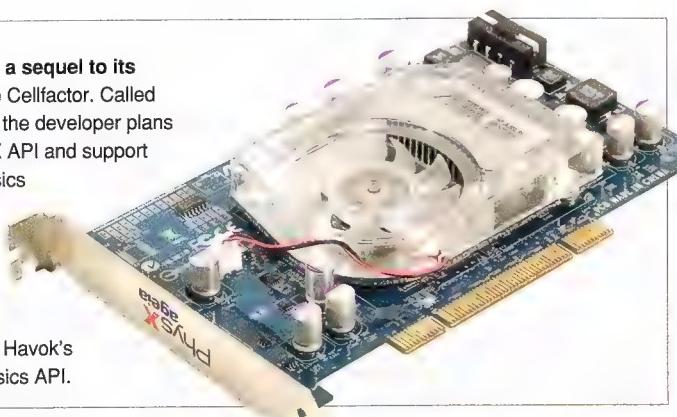
a few holding points, you'll be awarded a level and the option to learn new abilities. At any time during gameplay, you can hit 'M' to pull up a map of the current level to select a new class, reallocate skill points or choose a new spawn location.

Currently, all multiplayer is team-based. In fact, there's a special MP mode called 'Campaign' that allows you to progress into enemy territory as each map is secured. One map has the Undead pushing a giant siege tower into a castle wall to storm a Human stronghold. If the Undead manage to secure the castle, the next level has them progressing further into its depths.

Although very fun, the beta MP we played needed some tweaking. The knight class for instance was by far the best, requiring few or even no skill points to be effective. Most of the other classes, especially the mage, needed at least two experience levels to do anything even vaguely damaging. The controls also felt a little clunky and unresponsive.

No doubt these problems will be ironed out in the retail release, and we're definitely looking forward to re-living the glorious days of mods like FvF.

**Artificial Studios** has a sequel to its AGEIA-powered game Cellfactor. Called Cellfactor: Revolution, the developer plans to use AGEIA's PhysX API and support its own hardware physics accelerator. We wouldn't be surprised though, if the game, due out in December, ships with support for Havok FX, Havok's GPU-accelerated physics API.



## Pipeline Hot games to watch out for



### Genesis Rising: The Universal Crusade

**Release date** Early 2007

Developer Metamorf Studios' crack at the space RTS genre that Homeworld forged is almost with us. Called Genesis Rising: The Universal Crusade, this nifty looking game is set in the distant future. Unlike typical *Star Trek* scenarios, in which every alien race can kick your arse, humans are the dominant galactic species.

A new race, the Organids, has however adapted to everything humans can throw at them, forcing mankind to hole up at the Universal Heart, the source of all life in the universe humanity's only hope.

So, what can you look forward to? There's the 3D engine, reminiscent of Homeworld; fast-paced space combat; trading; diplomacy and 'organic' units that can be upgraded on the fly.

**Platform PC**

**Developer** Metamorf Studios

**Publisher** DreamCatcher

**Web** [www.dreamcatchergames.com](http://www.dreamcatchergames.com)



### Need for Speed: Carbon

**Release date** November 2006

In development at EA's Black Box studio in Vancouver, Need for Speed: Carbon places the player in a city in which they're free to roam, as with recent NfS titles – except it'll be bigger, more detailed and just generally more excellent. Unlike previous games your objective is to take over the entire city with your crew, block by block, race by race, and not just slam it down a one way street at 200km an hour.

A new option in Carbon is that of 'wingmen'. These guys offer you a variety of services while you race, from scouting to blocking other cars.

You can tweak the crap out of your vehicles, and, using a new technology developed by Black Box called 'Autosculpt', you can shape your cars to your exact specifications. Drift racing is back, having been absent from NfS: Most Wanted.

**Platform All**

**Developer** EA Black Box

**Publisher** EA Games

**Web** [www.ea.com/nfs/carbon/us](http://www.ea.com/nfs/carbon/us)

## Causing Havok

Havok physics has been present in games for years. Here's a run down of past, present and future titles that make use of the technology.



### Max Payne 2: The Fall of Max Payne

Havok received a lot of press with Remedy's Max Payne 2 in 2003. The slow bullet air distortion (and tracking of shots), full-bodied explosions, ragdoll and debris demanded a capable physics engine, and Havok did an excellent job.



### Half-Life 2

Havok made itself a household name for gamers when Half-Life 2 hit, with Valve making physics a functional element in gameplay. Almost all objects in the game's environments could be pulled, shot, picked up or thrown.



### Elder Scrolls 4: Oblivion

Gamebryo's graphics and Speedtree's vegetation got the attention but Havok added realism to Oblivion's sprawling world. Check out the YouTube flick showing off Havok in Oblivion via one crazy domino setup!



### Alan Wake

Remedy will be back in 2007 (or maybe 2008) with Alan Wake, which according to Havok's site, is just one of many games set to feature Havok. We hope this spooky thriller uses Havok 4.0, and supports Havok FX for GPU-accelerated physics.

# ATOMIC CHAT

Tailored  
fine-tuned  
behaviour

## Jeff Yates

**Atomic** has a little talk with the Vice President of Product Management at Havok on the Havok 4 API, Havok FX and more.



**atomic** How long has Havok 4 been in development? Aside from Havok FX and Behavior, what else does the new version introduce?

**Jeff Yates** Once we finish a version we begin working on the next. We prefer not to release new versions with only one or two minor changes every few months, but instead examine where the industry is going and incorporate major technology changes that will have a substantial impact to developers. In addition to Havok FX and Behavior the 4.0 release optimises Havok's HydraCore technology to distribute physics and animation even more broadly across multi-core processing units.

**atomic** What is your opinion of hardware-accelerated physics? Was Havok working on a solution before the announcement of AGEIA's PhysX?

**Jeff Yates** The notion of specialised hardware for accelerated physics is not something new, and though it can have short-term advantages, specialised hardware devices almost inevitably fall within the growth path of more general, established hardware solutions. Compared to other add-on hardware options for accelerating physics, we think GPUs have a very compelling advantage in the market place today in terms of installed base, technical momentum, and software infrastructure. In particular, being able to leverage the incredible investment of companies like Microsoft, NVIDIA and ATI around the development of more general shader languages and software tools is a tremendous advantage in favour of the GPUs as you look out even one year. This is why we have chosen to partner with NVIDIA and ATI for introducing effects physics, such as Havok FX, via their GPU solutions.

In terms of timing, we had been looking at the GPU for some time as a potential accelerator for physics. But it was not until the installed base for Shader Model 3 compatible GPUs reached critical mass in the consumer space that we figured it was time to announce our plans.

**atomic** Can you please expand on the 'multi-core processing' optimisations in the new Havok?

**Jeff Yates** HydraCore is the element of Havok 4 that allows game developers to assign and remove threads from the computationally heavy tasks that next-gen games require, from computing physics simulations to presenting complex character behaviours that are a sophisticated blend of traditional keyframe performances and dynamic controllers.

HydraCore accelerates computationally heavy tasks by dividing up the work load required for each interval of gameplay (typically one 60th of a second) into a list of 'jobs' that can be dispatched as needed by the game developer to utilise any number of central or secondary processing units (CPUs and SPUs) on next-generation game systems.

**atomic** Can the new features in Havok 4 be introduced into current games using Havok via a patch or update, or will games have to be developed from the ground up?

**Jeff Yates** Developers have the option to do either. Most of our developers will consider a new release when it becomes available during their active development cycle. If they have enough time to upgrade to Havok's latest release, they will generally do so, to maximise the performance, features and platform enhancements that go into a major release. If there is not enough time before a game releases, developers will generally wait until they plan to release an update or 'expansion pack' to incorporate a new version of Havok into their game. This gives them time to add new content or physics-based features and effects along with the Havok update.

**atomic** Is Havok Behavior a completely new addition, or has some functionality been present in previous versions of Havok?

**Jeff Yates** Havok Behavior is a completely new product. We work closely with our customers and listen to their wants and needs. One thing we kept hearing about was the lack of an SDK and tool that allows animators to quickly build and review character sequences before putting them into the game, as well as have the ability to customise character behaviours.

**atomic** How mature would you say Havok FX is at this time? What additional work needs to be done and how easy is it to take advantage of this component?

**Jeff Yates** We are quite happy with the initial performance of Havok FX, even though this is its first release. We were quite surprised to see that we could simulate literally tens of thousands of objects in our first round of optimisations with GPU manufacturers. That said, we fully expect to see more performance and feature enhancements in successive releases. The synergies between physics effects and rendering (on the GPU) afford a lot of interesting opportunities that we expect game developers will gladly take in the year ahead.

**atomic** What is the next step for Havok, and physics?

**Jeff Yates** We clearly see the role of physics becoming more central to gameplay and to the visual richness in games as time goes on. For Havok's part, we will be looking at ways of bringing physics into the hands of character animators who would like to see characters respond more realistically to their physical world – and to each other. That's one of the roles that our new Havok Behavior product plays, and we think that helps address one of the central challenges of games going forward – enabling more convincing character performances.

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# Makings of malicious malware

**Viruses, worms and trojans are all rather nasty, but the baddest of these are worms. Ashton Mills explores the nature of these ineffable programs.**

**I**t's a fitting title for computer viruses to be named after their real-world counterparts. For the most part, viruses on computers have similar intentions and infiltrate by similarly obtuse means. By definition viruses infect programs and partitions, but aren't designed to spread across networks. That privilege belongs to worms.

The primary goal of a worm is to proliferate, and although capable of carrying malicious payloads and behaving very much like viruses, this isn't necessarily the case – legend has it that the first worm ever written was by a team at Xerox PARC in 1978 that was made to find idle processors on a network and dole out tasks, all in the name of aiding efficiency. And the Welchia worm, in 2003, went around downloading the latest security updates from Microsoft on the

machines it infected, in the process plugging the same hole it exploited to enter the system.

Today, worms are largely malicious in nature and use a variety of mechanisms to infiltrate computers and spread across networks, especially the Internet. To make matters worse they often act as trojans, spyware, and mass-mailers for spam, making the damage they can do as diverse as the worms themselves.

## A worm's playground

The networked world we live in today is a veritable playground for worms, and has made them the number one most wanted on the malware hit list. And with good reason – there are hundreds of new worms every year, and the particularly nasty ones can cause billions

of dollars of damage due to lost productivity for businesses. These are the outbreaks that usually make the news.

The worm's primary goal is to spread, and it will do this in a variety of means, but not all of them technical. As Kevin Mitnick is famous for demonstrating, the weakest link in a system's security is the fleshbag sitting between keyboard and chair.

While worms often spread by taking advantage of legitimate system services or holes in software, they almost always get a foothold first thanks to social engineering – frequently people clicking on programs or opening attachments they really shouldn't. The first recorded malicious worm that spread on the Internet was 'Melissa' in 1999, and came embedded in a Word document that had to be opened to run as a macro virus.

In fact worms are, essentially, programs just like any other on your system – only with a different agenda than rendering you a webpage. As programs they have as much reign on a system as any other application – which is to say a lot, as Windows defaults users to Administrator privileges.

All worms, however, can be broken down into two parts: propagation and payload.

## Propagation

Unlike viruses which are traditionally executable, and work by injecting their code into other executables, worms can be an executable, a script, a macro or any other interpreted or compiled language that allows the author to exploit flaws in a system.

The first public abuse of buffer overruns, which are all the rage these days, was the Morris worm in 1988 that took advantage of a buffer overrun vulnerability in BSD. It's also the first known worm to spread via the Internet.

Regardless of the code used to construct them, worms are designed to spread through multiple means that include but are not limited to:

- Email
- Instant messengers
- P2P software
- Open network shares
- Exploitation of system services
- Websites (JavaScript and browser vulnerabilities)
- Back doors (sometimes left by previous worms)

**How these services are exploited is as varied as the worms themselves:**

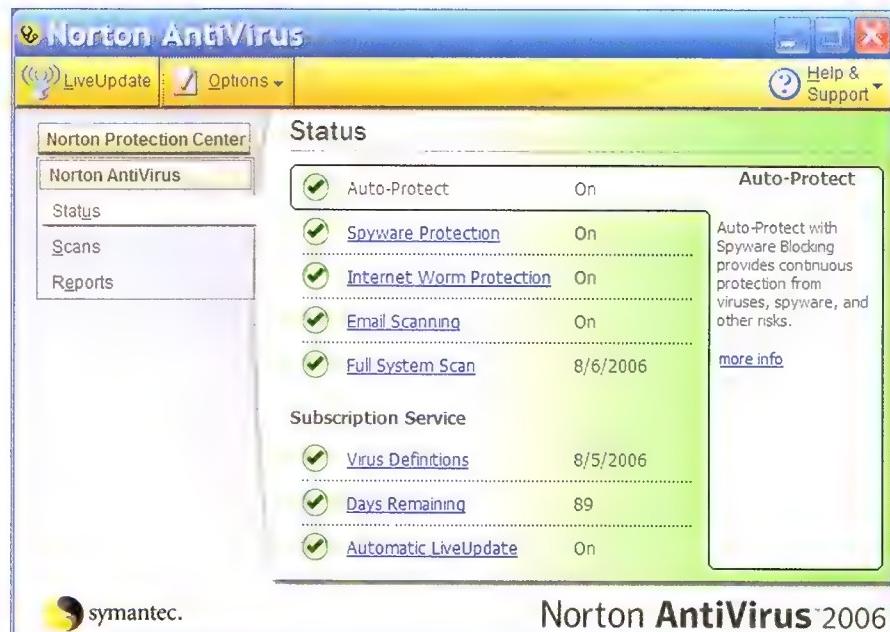
- The well-known Sasser worm in 2004 exploited a buffer overflow in the LSASS (Local Security Authority Subsystem Service), hence the name, and spread through TCP port 445 and 139 (commonly related to Windows file sharing).
- The ILOVEYOU worm of 2000, also known as

the 'Love Bug', enjoyed success thanks to email and socially engineered subject lines.

- In 2003 the Slammer worm became famous for injecting code into running services, while the Spida worm was able to login to Microsoft's SQL servers.
- Then there's the Jitux worm, which while written in Visual Basic, was smart enough to spread via MSN Messenger. And Axam hooked onto P2P software, copying itself to the shared directories of Kazaa, Morpheus, BearShare, eDonkey and Limewire, in addition to mass-mailing through Outlook.

And in the case of Nimda ('admin' backwards), almost all of the above mechanisms were employed, spreading via email, websites through JavaScript, shared drives, IIS servers and backdoors left by other worms.

In the case of spreading via email, worms usually include their own Simple Mail Transfer Protocol (SMTP) code to directly email copies of themselves to addresses in the host system's address book. They are smart enough to ignore addresses to 'root' or 'admin', and to transmit



▲ Antiviral software has come a long way – most products now also scan emails (to pick up on worms and viruses before you get to them) as well as detecting spyware.

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**BREAKING ADVISORY**  
August 3, 2006. Microsoft has announced that it plans to release twelve Security Bulletins for Microsoft Windows and Microsoft Office on August 8th 2006. Ten of the twelve will cover the Windows operating systems, with the remainder covering the Microsoft Office Suite. The highest rating for any of these two sets of bulletins is critical.

**Global Threat Condition**  
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**McAfee Avert Labs Sage Report**

▲ Popular vendors like McAfee and Symantec provide regular updates to new worm and virus releases in the wild. Especially damaging variants can sometimes prompt free, targeted, removal software to help stem their spread.

- Damage or delete system files
- Deface webpages
- Plant backdoors
- Install keyloggers
- Act as DDoS (Distributed Denial of Service) zombies
- Perform spam duties
- Send password files
- Transmit sensitive data

To name just a few. Today, a worm's payload is increasingly about data acquisition rather than damage. And by acquisition we're talking about sifting for credit card numbers, capturing passwords, key logging for bank accounts, transmitting private data, and control of remote systems. Nice stuff.

In fact backdoors created by worms are a major problem. Worms can login to an IRC server and sit in channels waiting for commands, which could be to perform any of the tasks listed above. Such machines are called 'zombies', and en masse 'bot-nets'

The victim machines are usually 'mum and

from a variety of common names like 'adam' or 'julie'. Some even send emails in more than one language.

When it comes to ports, worms will look for and try to penetrate through open ports for services they know they can exploit (often through services or applications with known and unpatched vulnerabilities). Often, it's the rapid and high volume of network traffic that a worm causes that first alerts system administrators to their presence.

## Payloads

While a worm's primary design is to spread, they also have a payload to deliver – the actions to perform on an infected system. As with infection mechanisms, payloads can be just as varied:

dad's computers, belonging to users with little knowledge of threats from the Net. Bot-nets can be used to mass-mail spam or launch DDoS attacks against hosts, flooding a target address and knocking a machine or Website off the Net.

In January this year a 20-year-old from the United States was convicted of controlling and profiting from a network of some 500,000 zombie machines.

It probably didn't help at all that he targeted the US Naval Warfare Center and Department of Defence!

## Staying alive

Worm authors aren't stupid (unfortunately) and many worms employ a variety of methods to avoid detection or prevent removal, including:

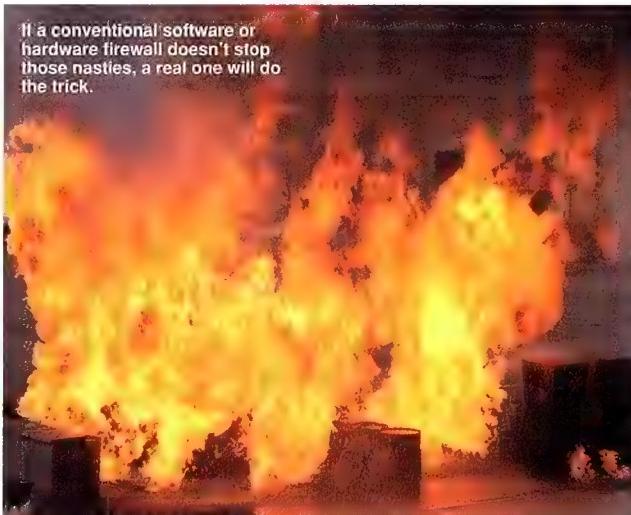
- Impersonating a legitimate program in the process list
  - Hiding from the process list
  - Hiding inside running applications
  - Selectively spamming email addresses
  - Looking for and disabling virus scanners
  - Looking for and bypassing firewall software
  - Hiding on hard drives as valid applications
- Worms that mass-mail are smart enough

to omit domains belonging to security firms and malware researchers and, in some cases, worms have been programmed to look for and disable security suites from the likes of Symantec, McAfee and Sophos – at least until the next update. Sometimes these packages become the target themselves as a means to enter a system – as Symantec was forced to address with its antivirus software earlier this year. So not even dedicated security software is safe.

And, of course, propagation is the ultimate in self-preservation.



## Famous worms A snippet of the thousands of worms the world has seen.



### Morris

The Morris worm, named after its author Robert Morris, was the first worm released on the Internet, in 1988. At the time, Morris was working for the MIT Artificial Intelligence Laboratory, and suffered a fine and a slap on the wrist for his efforts.

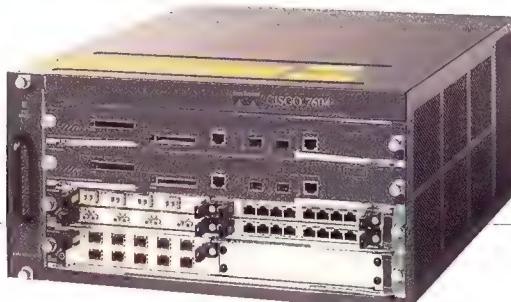
### Samy

Samy earns the moniker of fastest spreading worm of all time – to date, at least. In October 2005 Samy spread to more than a million users within 24 hours thanks to its exploitation of social-networking site MySpace.

### Zotob

Zotob gained notoriety principally because some of the world's largest media organisations were hit by it, which naturally led to widespread coverage of the worm. In the US, the ABC, CNN, *New York Times* and Associated Press were all infected and suffered from the worm.

Many worms are designed to bring hardware, like this Cisco router, to its knees.



### Santy

Santy, in December 2004, earns the credit of first known 'Webworm' and exploits a vulnerability in phpBB (the most popular bulletin board software on the Web) and used Google to find new targets. Some 40,000 machines were infected before Google blacklisted the search.

### Slammer

Gaining worldwide recognition in 2003, Slammer exploited a buffer overflow in Microsoft's SQL Server and infected some 75,000 machines within 10 minutes of release, causing massive network congestion in its attempts to spread. Several ISPs around the world were knocked out of action.

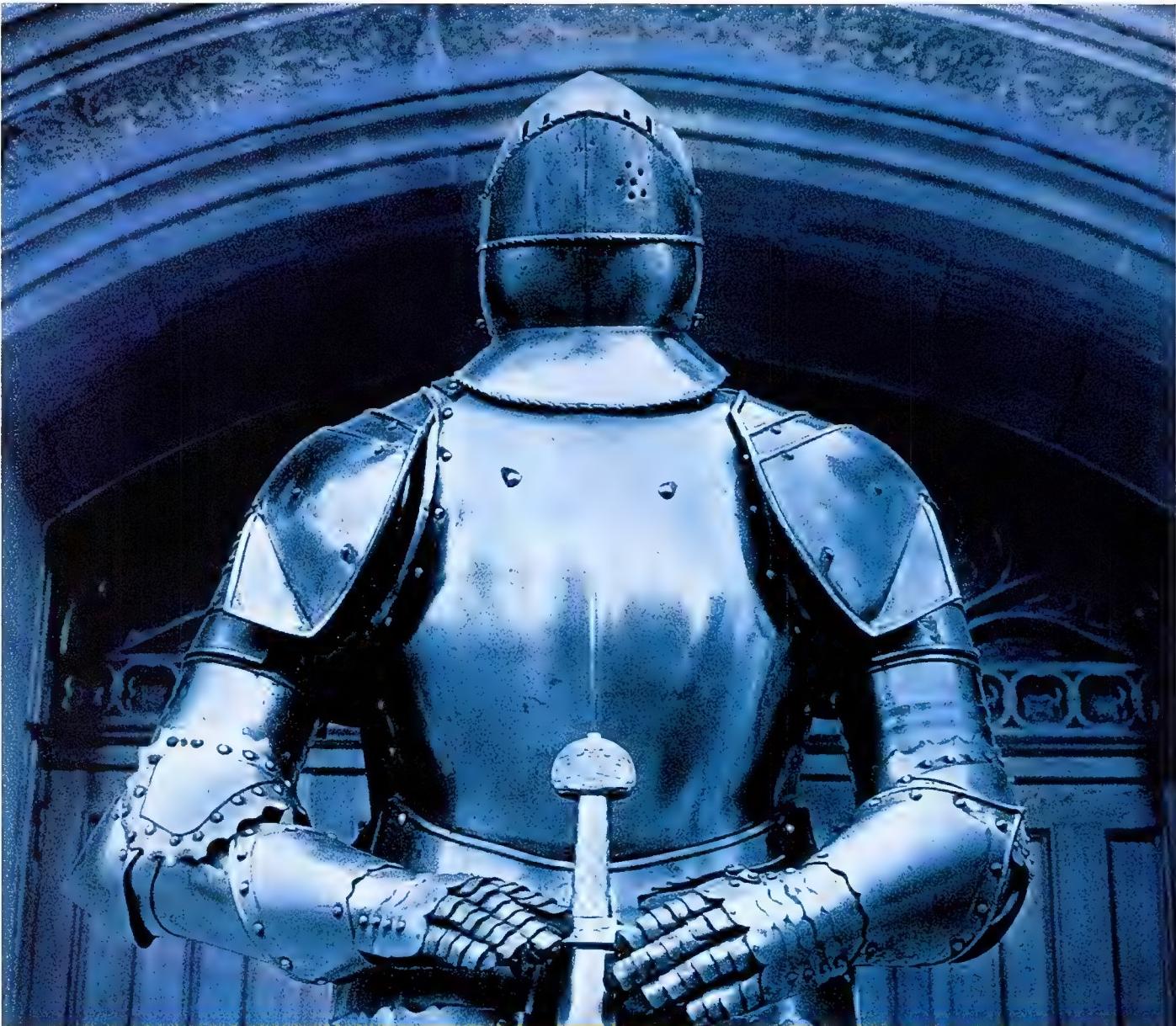
### Blaster

Blaster also gets recognition in 2003 for not only spreading like wildfire but also attempting to pre-empt its removal via the Windows' platform most accessible security update service – Windows Update. In addition to spreading the worm, infected hosts launched SYN packet floods against port 80 of [windowsupdate.com](http://windowsupdate.com) to make the site barely accessible.



### MyDoom

Not quite as fast as Samy, in 2004 MyDoom nonetheless became the fastest spreading email worm to date. Speculation at the time held that the development of MyDoom was funded by spammers to create new spamming nodes. It was smart enough to transmit email hooks in more than one language, and copy itself to KaZaA's shared folder for uploading by unwary users of the P2P software.

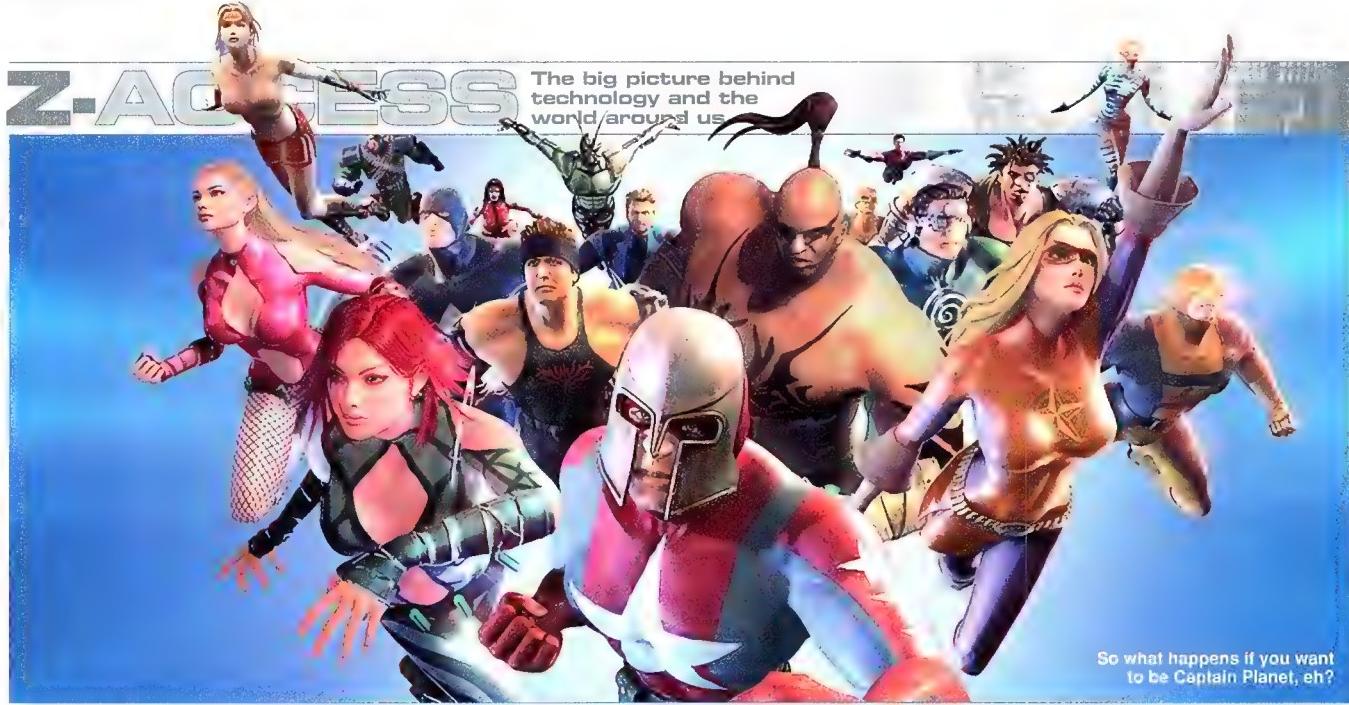


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# What do you want to be?

Want to be a space smuggler, superhero or ninja? Tim Dean reckons you do.

I have a theory. It's not a complicated theory. It involves no equations. In fact, there are no numerals at all besides the number three. My theory only hopes to shed a little light on the male psyche (and the psyche of a not inconsiderable proportion of women too).

Theories like this can be helpful in a range of ways. They can assist us in predicting behaviour. They can also explain mechanisms of cognition that underpin our thought. And sometimes the theory can tell us a little about ourselves that we might not have realised before.

My theory is that every male (and many females) under the age of 35 (give or take a few years) wants to be one (or all) of three things: Han Solo; a superhero; or a ninja. Think about it.

It's not rocket science. And, judging by some very unscientific anecdotal research I've conducted, such as the odd straw poll at the pub, it's pretty robust.

It's worth flagging that my theory doesn't state that people necessarily want to be one of the triumvirate more than anything else in the world, nor that some other fictional or historical character takes precedence in their psychology. Heck, some people might want to be C-3PO or Jar Jar Binks more than anything in the world (and believe me, I met a few of them during my brief stint on Star Wars Galaxies). More power to them – they're just not people I choose to fraternise with voluntarily.

So what does this theory mean for us? Well, quite simply, the games industry has overlooked some fundamental truths about its audience. Not that it hasn't made an effort. But the effort has usually been somewhat off the mark.

Let's take Han Solo. *Being* Han Solo entails smuggling illegal goods from under the noses of tyrannical and lethal (and for some reason, English) Imperial forces, while trying to keep your ramshackle hotshot tramp freighter held together with black market parts and good will alone.



Now let's see what the games industry has given us. Barring Elite and Privateer, we have a few contenders for the Han Solo experience. We have Freelancer, which could best be described as tepid, flaccid and with an economy that's as deep as a puddle. There's the X series, which is more like a clunky space engine with gameplay and the UI slapped on as an afterthought. And iWar 2, which is a little better, but it's a bit soulless compared to the vibrancy of the *Star Wars* universe.

How about superheroes? Sadly this genre is dominated by 'Official Games™', which is usually a synonym for unimaginative, derivative crap intended to be fobbed off along with the oversized novelty plastic cup and T-shirt as part of the movie marketing machine.

Thankfully there are a couple of notable exceptions. A few of the Marvel games are well worth a look, as is the innovative City of Heroes/Villains MMO. In fact, the latter fits the bill nicely, as you can be *any* superhero you so desire. Pow!

Then we come to ninjas. All I want to do is sneak around medieval Japanese fortresses, or modern metropolises, assassinating my liege's enemies using a veritable toolbox of lethal devices, from shuriken to garrottes to poison blades. Is that so hard to imagine? Well, besides the few sneaky games that have appeared in the last decade or so, there's still no truly authentic ninja experience out there.

So, while we wait, I guess we'll just have to live with being US marines, military generals, knights, mages and town planners – not that any of those are in my top three alternate personas...

Tim really wanted to be Wonder Woman but her costume makes his butt look too big.  
[tim@atomicmpc.com.au](mailto:tim@atomicmpc.com.au)





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What's the first thought that crosses your mind when the words 'quiet PC' are mentioned? If your answer is 'slow', or 'HTPC', then the chances are that you are one of the vast majority of modders, including me, who has been raised on the creed that 'performance computing has an aural cost'. If you have ever heard a 60mm Black Delta fan running at 8000RPM you can validate this statement.

The truth is that a modern PC can bridge both worlds, and sustain great performance without making its presence obvious to the rest of the neighbourhood. However, regardless of whether it's a five-year-old clunker or a cutting-edge beast, a desktop or tower computer contains moving parts that inevitably generate vibration – and vibration manifests itself as noise to the human ear. Case and component fans, even hard disk drives (HDD), will combine to create quite a cacophony of sound when they function properly, a situation exacerbated even further by worn or inefficient devices.

The burning question is, 'What actually constitutes "quiet"?' Like most non-scientific questions, the answer to this deliberation is going to be different for every individual, but as a rough rule of thumb *nirvana* is considered to be achieved at 30dBA or less – well below the ambient sound levels of a normal domestic household.

The bad news is that tuning your PC for silence is a bit like restoring an old car – every time that you get one part right, something else will need attention! After all, who would have ever believed that a hard drive spin-up could be annoying until you can actually hear it? The good news is that new products aimed at quietening your PC are constantly hitting the marketplace, and a few simple upgrades in the right places can make a distinct difference without compromising overall performance.

Processor heatsinks are the obvious starting point for a quiet PC, however the huge variation of socket configurations, size of suitable footprints and ability to swap out fans to meet the performance/noise requirements makes this too complex a subject to cover in this short space. Suffice it to say, that for low-noise air cooling, the basics are to use as much heatsink surface area as possible, with sufficient airflow to maximise heat transfer.

For similar reasons we have also avoided the subject of watercooling, however the topics below can be considered as part of a holistic noise reduction program to be used in conjunction with your preferred method of CPU cooling. Remember, although watercooling can make a huge dent in the aural output from your PC, there are still the inevitable fans and pumps that need to be considered as part of the noise equation.

## HEATSINKS AND FANS

The obvious place to start the discussion is the case itself and its airflow attributes. Keeping the internal temperature as close to the outside ambient is the goal, and achieving this requires the case air to be replaced, or 'turned over', about every six seconds. Some cases, such as the Cooler Master ATC-210, start with inherent problems, as they have no real allowance for volume air intake. However there are products that can alleviate this without performing major surgery, as we will discuss later.

How much airflow is really needed? If you assume that an average midi-tower has internal 'free-space' dimensions of 20x30x20cm, it would have a notional internal air volume of 12 litres, and would require an airflow of 120 litres – or about six cubic feet – per minute. This is where it gets tricky. To keep things as quiet as possible you need to keep the airspeed low, because rushing air creates additional noise. If you are using 80mm fans, the area of the intake is ( $\pi r^2$ ) 50cm<sup>2</sup>, whereas if you use 120mm fans the area becomes 113cm<sup>2</sup>, so theoretically the same amount of air can flow through the fan aperture at less than half the speed – or, in other words, 1x 120mm is better than 2x 80s. Granted, all of these figures are academic, and sometimes don't seem to transfer across to practical situations, however they do support the actuality that 12cm case fans at low speed are the best solution for quiet computing. The choice of fan is the important part.

There are so many fans to choose from, especially in the 'target group' of silent 12cm. The main attributes to consider are fairly simple – airflow in cubic feet per minute (CFM), and noise level in decibels (dBA). There are other attributes that are worth considering, such as rotational speed, bearing type, and rated current, however these characteristics are less important than the core process of moving air quietly.

After testing product from most of the iconic brands, the two that seemed to stand out from the crowd in actual usage were the Scythe SFF21D S-Flex and the Nexus D12SL-12. The Scythe is rated for 33.5CFM at 8.7dBA, and has a dynamic fluid bearing for reduced vibration and longer component lifespan. The Nexus specifications quote 36.8CFM at 22.8dBA, which is a much higher noise level – four times louder, in fact. However, in bench testing there was no discernable acoustic difference. The biggest disappointment was the SilenX IXP-74-14, which promised 72CFM at only 14dBA, but turned out to be appreciably louder than the others. We found that, as a subjective guide, anything under 20dBA was basically inaudible from 50cm distance.



Scythe and Nexus both make excellent low speed (and low noise) fans. Such fans are a worthy addition to any silent PC.

72dBA is definitely not a number you want to see when measuring the sound levels of your PC. Unless it happens to double as an explosion.



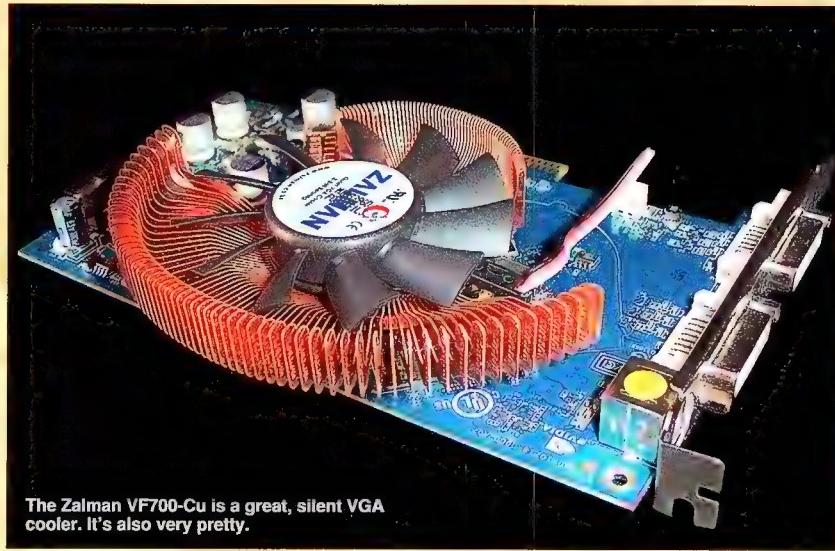
Most PC cases aren't that great at dampening noise. This can be easily fixed.



## HEATSINKS AND FANS *(continued)*

Video card GPU cooling is one area that can often make a very measurable difference, both in gaining performance as well as noise reduction. Most graphics cards ship with small diameter, high speed heatsink fans that invariably seem to become noisy after a short time; usually developing an annoying high-pitched whine that can be heard over everything else. A good choice of aftermarket heatsink unit, with a large, low-speed fan, can slash as much as 5dBA off noise levels while reducing operating temperatures by as many degrees, the downside being that most units will impinge on the top PCI expansion slot. The usual difficulty in selecting the right component is ensuring compatibility with your card's PCB (printed circuit board) design, so research thoroughly before making a purchase. A solid choice for older generation cards is the Zalman VF700-Cu VGA Cooler, which has wide compatibility, and generates between 18.5dBA in 7V silent mode and 28.5dBA in 12V normal mode.

If you don't want to replace your current setup, the most cost effective method of taming the noise from an existing air-beater is to lower its rotational speed. This is a double-edged sword, as there will obviously be a proportionate drop in airflow, however it can be a flexible option if you only need a quiet PC some of the time. Fan controllers can be as simple or as complex as your budget allows, and range from home made 7V cross-over leads, simple analog resistor circuits, right up to temperature-controlled digital units using Pulse Width Modulation technology and costing well over \$100.



The Zalman VF700-Cu is a great, silent VGA cooler. It's also very pretty.

If you're not willing to completely rid your PC of fans, a fan speed controller may be the answer.



## MOTHERBOARD AND CASE

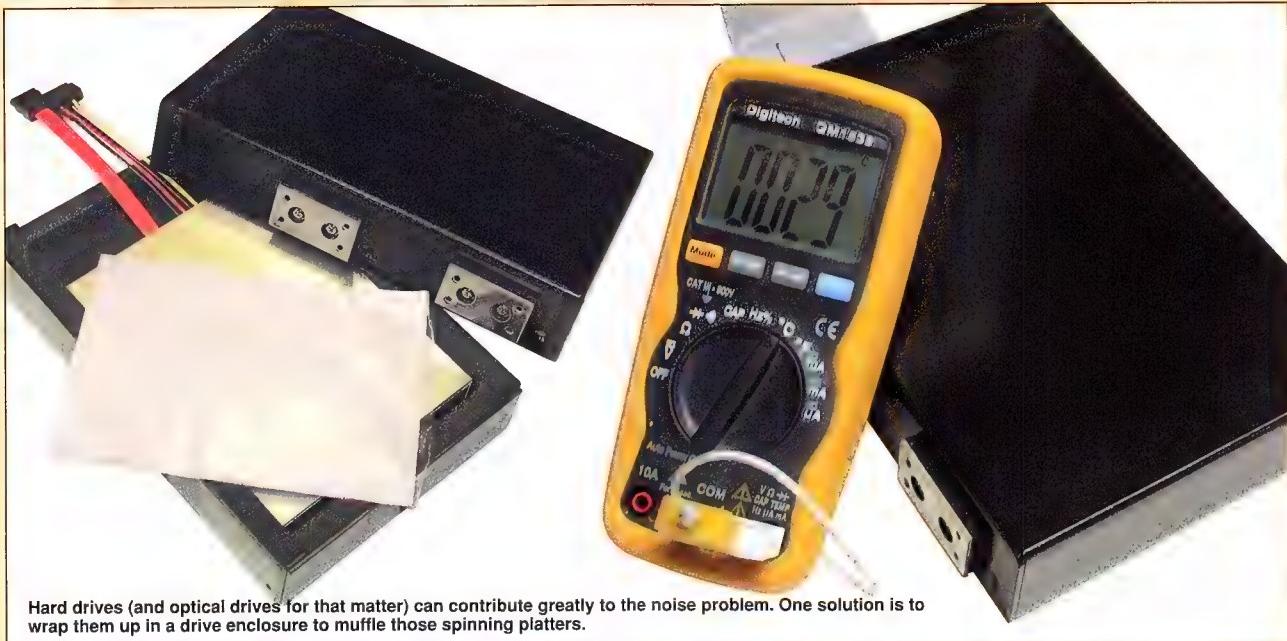
Once the majority of the noise has been banished from your PC, the last few 'tenths of a bit' can be achieved with the use of second-tier sound reduction.

For example, a passive northbridge cooler such as the Zalman ZM-NBF47 is an essential replacement for the OEM heatsink and fan, while sound deadening acoustic foam and siliceous anti-vibration products are also a good investment for a few dollars. While these items are almost pointless on their own, their combined use will have an appreciable effect on the overall outcome.



You really can't go wrong with Zalman. Passive is the name of the game for the company, a fact reflected in its ZM-NBF47 northbridge cooler.

## HARD DRIVES



Hard drives (and optical drives for that matter) can contribute greatly to the noise problem. One solution is to wrap them up in a drive enclosure to muffle those spinning platters.

One of the more novel products that we tested was the Scythe Quiet Drive, a hard disk drive enclosure that uses a double-skinned box structure lined with sound proofing and anti-vibration pads to eliminate HDD noise. Thermal conductive sheets have been incorporated into the design to achieve cooling efficiency. The package includes

short extension leads for both SATA data and power leads, but it is not suitable for rounded IDE cables without some minor modifications.

With some cynicism we assembled the enclosure, using an extremely noisy IDE drive, and with a temperature probe placed right against the drive motor. After two hours

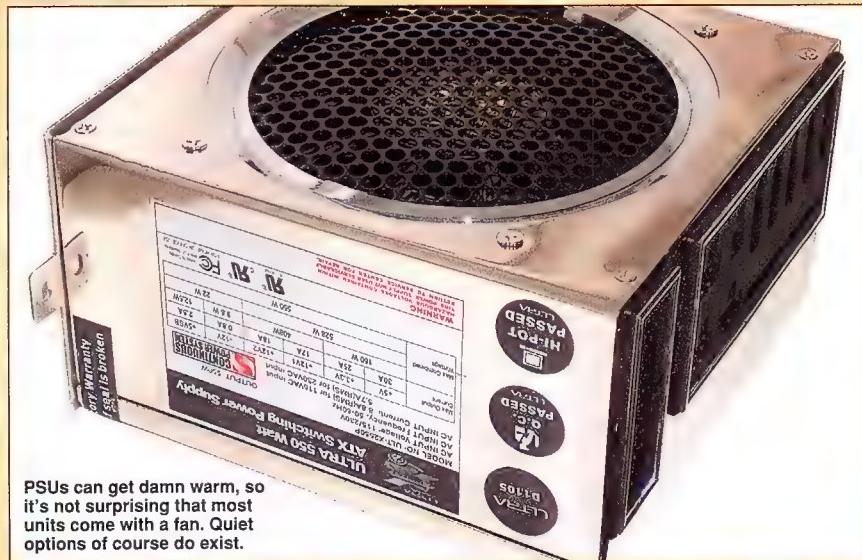
of running Sisoft Sandra's drive speed test in a 15°C environment, the drive temp reached 29°C and left our jaws on our knees. Not only did the drive stay cool, it did it in almost complete silence, dropping 5dBA off the system total – which is effectively halving the perceived noise level! This product is not a gimmick, it really performs.

## POWER SUPPLIES

At first glance, the concept of a fan-less power supply (PSU) is exciting, until the realisation hits that this also removes one of the traditional outflow fans. So rather than help keep the system cool it will actually add heat by convection. The other issue is that most 'true' silent offerings are on the low(er) end of the output scale, and not up to the task of keeping power-hungry performance motherboards and CPUs running stably at overclocked speeds.

The next option is a hybrid PSU, one that relies on large heatsinks to keep cool at low demand, and a low-speed fan to keep temperatures down at peak loads. As an example, the Antec Phantom 350 is a 'true' silent PSU, as it does not have any active cooling, whereas its 500W sibling has a variable temperature-driven fan that cuts in at a preset temp. Most of the hybrid power supplies are still only available in 500W or less configurations, and in our testing the fan-assist mode seemed to be operating more often than not.

The final choice is probably the best



PSUs can get damn warm, so it's not surprising that most units come with a fan. Quiet options of course do exist.

compromise, and that is a quality PSU that uses a low-speed 12cm fan to keep some airflow moving at all times. Looking at several different makes, the most impressive was the Ultra

X-Finity 550W, which includes the now-mandatory PCI Express, SATA and 8-pin EPS connectors. We had to physically look at the 12cm fan several times to see if it was moving!

## DRIVE BAY MODULE MOD



Thermaltake's iCage Module is not really a traditional quiet PC component, however it is interesting from the perspective that it makes sense to use one larger fan to keep all of your hard drives cool, especially if that fan can also be used as an additional air intake.

These purpose-built products first appeared in 'mesh fronted' cases, like the Thermaltake and Cooler Master Stacker series, and use very quiet 12cm fans that move a reasonable amount of air. The only problem is – where will the unit draw its air from if the case does not have an existing 120mm blowhole in the front bezel?

Enter the Scythe Kama Bay System Cooler, which is really just a 12cm fan and 'hard to service' foam filter, screwed inside a steel mesh replacement for 3x 5.25" drive bay covers. On its own the Kama Bay does

have excellent cooling properties, as it adds a 132cm<sup>2</sup> air intake to the front of a case

drilling) it can be used in conjunction with the iCage module to create a simple but effective cooling mod.

The first step is to remove the fan from the iCage, and drill out the threaded holes so that 3mm screws will pass through. The next task is to cut 6mm off the rear section of the Kama Bay, so that the rear edge is flush with the rear of the fan – in this case we swapped out the OEM fan for a Nexus Real Silent Case Fan. To minimise any vibration, a 12cm siliceous fan damper was sandwiched between the iCage and the Kama Bay, and the three components screwed together with standard 3x30mm fan screws. For only \$80, the finished module adds a heap of additional 'quiet' airflow to any case, and has the potential to keep three hard drives at optimal operating temperature. We will call it 'Kama Cage'.

**'For only \$80 the finished module adds a heap of additional quiet airflow.'**

– which is more effective than a 120mm blowhole – but (with some cutting and



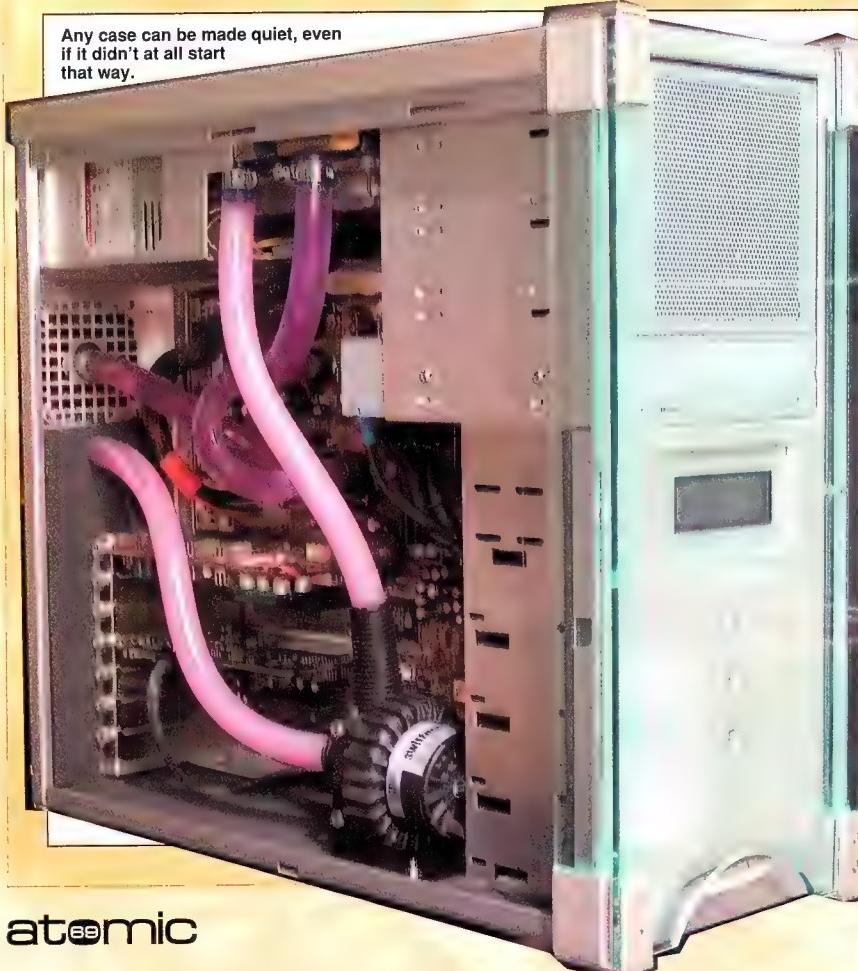
## QUIET IS AS QUIET DOES



'Silent' PSUs come in many shapes and sizes. Choose the one that best meets your power needs without being too loud.

Applying all our tips to the Cooler Master case shown earlier, it now has a reasonable volume of airflow passing through it, and the internal ambient temperatures have been reduced by 5-7°C. With the addition of quieter fans, efficient graphics card HSF, a quiet power supply, hard drive silencer and plenty of acoustic dampening, the sound level of this case dropped from a reasonable 45dBA, to a 'whisper quiet' 31dBA (measured at one metre distance) even though it now has a large vent in the front of it. Overall, the PC runs cooler and quieter, creating a more stable environment for overclocking.

Any case can be made quiet, even if it didn't at all start that way.



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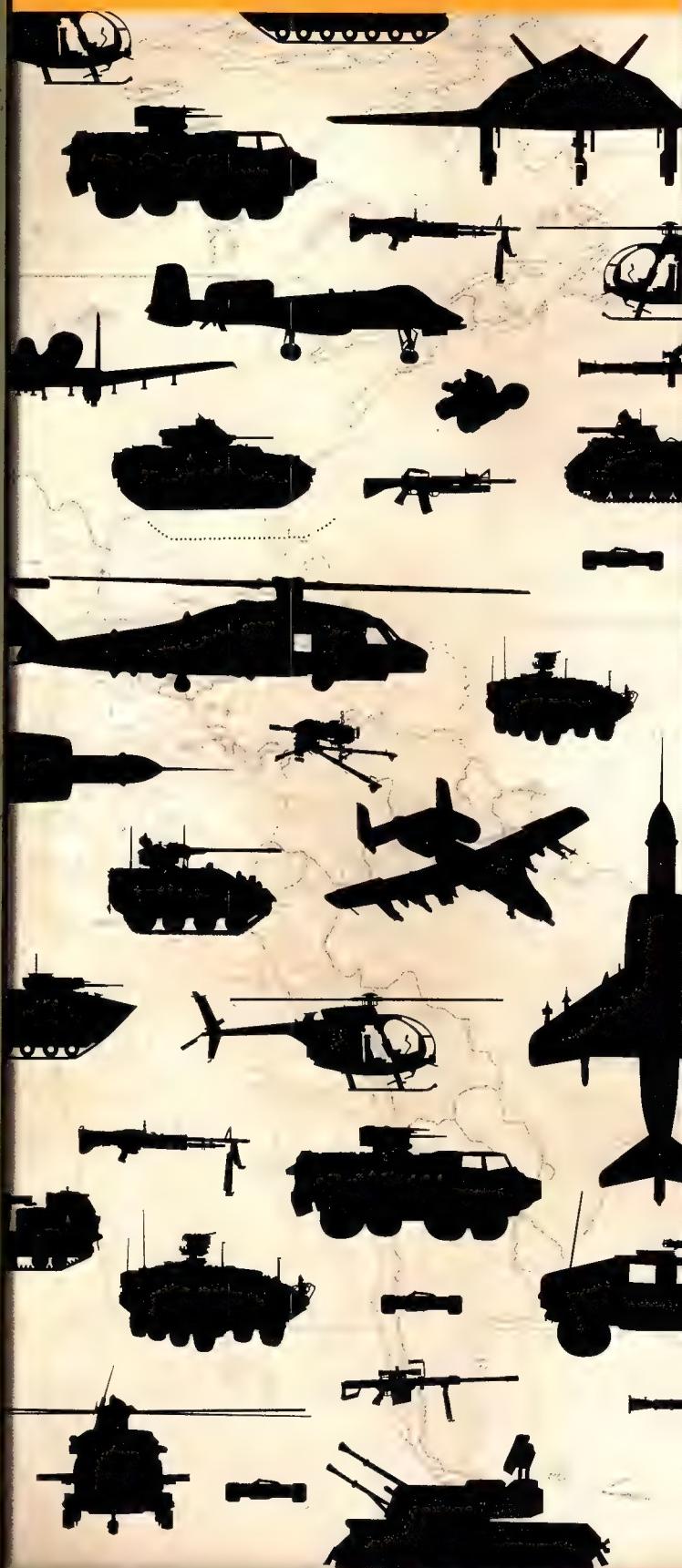


Moderate violence,  
Moderate coarse  
language

PC  
CD-ROM  
SOFTWARE



"FAST-PACED TACTICAL STRATEGY IN

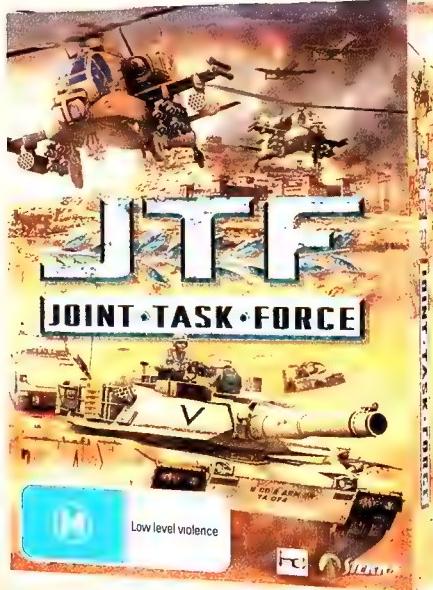


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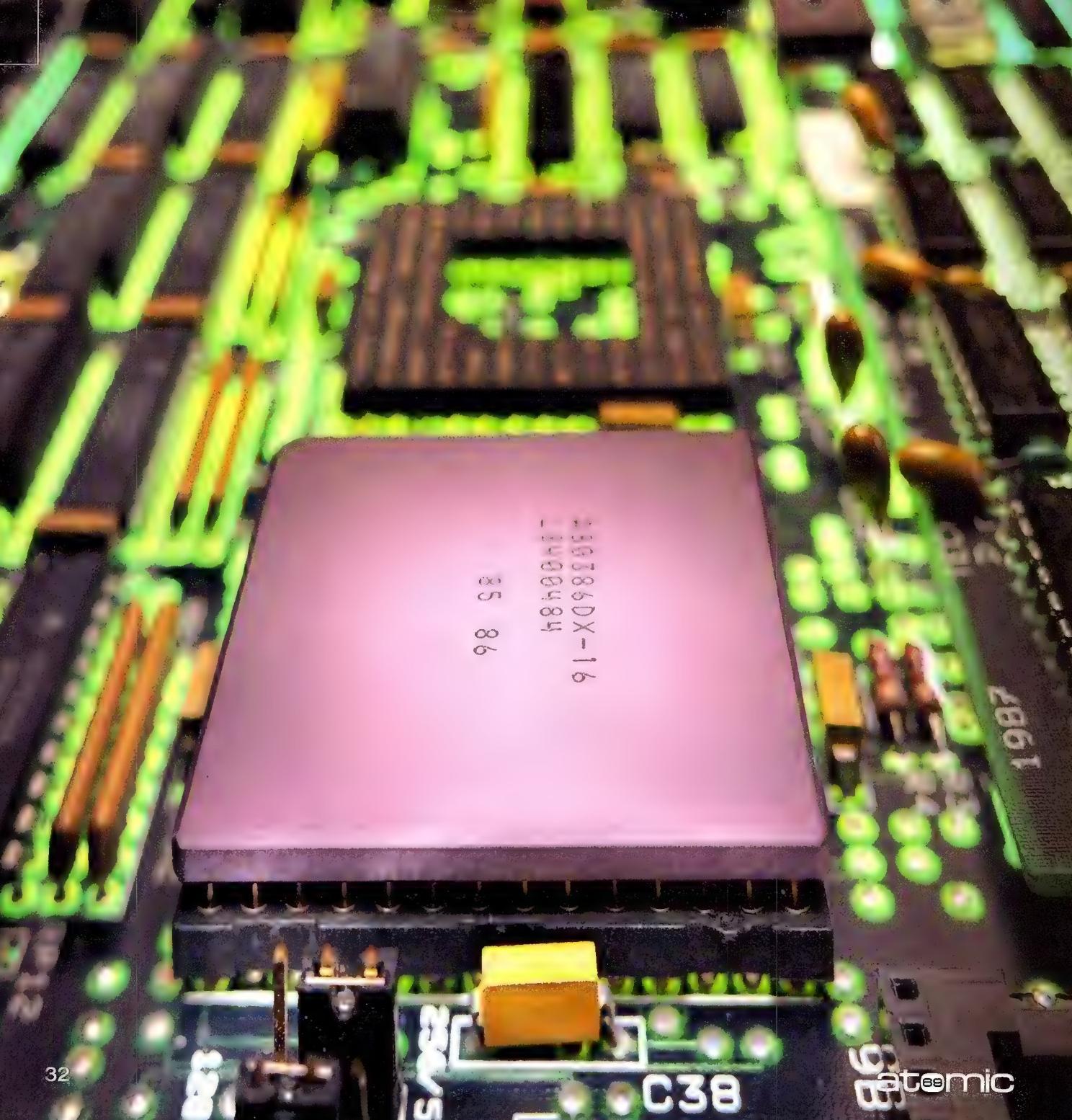
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# PURPOSE

**James Wang explains how the graphics processor has superseded the humble CPU at its own game, and investigates its new horizons as the general purpose GPU.**

If a chronicle on CPU and GPU architectures were to be written, the title 'The decline of the CPU' would not be at all unfitting. It is a miserable story really. In 1997, NVIDIA's first successful graphics card, the RIVA 128 had 3.5 million transistors – less than half of the 7.5 million transistors used to build the flagship CPU of the time, the Pentium II. Two years later, the tables had turned; NVIDIA's GeForce 256 sported 23 million transistors, more than doubling the resources of Intel's newest processor, the Pentium III. From there on, the GPU dominated the CPU in transistor resources. By 2004, Intel was no longer the favoured CPU for gaming. But AMD fared no better. Its proudest creation, the Athlon 64, was made up of 106 million transistors, still less than half the number used in ATI and NVIDIA's DirectX 9 GPUs.

Transistor count, by itself, tells little of performance. A more useful measure is programmable floating point performance, or the speed at which a chip can do decimal arithmetic. Intel's latest desktop CPU, the Core 2 Extreme X6800, can push an unprecedented 47 gigaflops a second. Next to ATI's RADEON X1900 XTX, which can crunch 416 gigaflops, the CPU appears meagre and underwhelming.

To say that this is an astonishing development in computer architecture is an understatement; how did the 'central' processing unit become dwarfed by a mere add-on board?

Graphics processors have managed to soak up more transistors mainly due to their highly scalable architecture; because rendering performance increases linearly with the number of graphics pipelines, graphics processors used as many transistors as feasible to build multiple pipelines. CPU performance on the other hand does not generally scale linearly with the number of cores. As such, transistor resources have been devoted to cache and deepening the pipeline, which uses far fewer transistors than building additional pipelines. The ability of graphics processors to employ more pipelines is the reason why they have soaked up transistors faster than their CPU counterparts, which has in turn made them much larger.

With additional graphics pipelines come additional floating point units. So as GPUs scaled their pipelines to eight vertex units and 48 pixel units, CPUs stood still with their lone SIMD (Single Instruction, Multiple Data) unit, their performance only better than the CPU of yesteryear due to a minor bump in clock speed.

Various add-on boards have also boasted superior performance to CPUs at a specific task. What differentiates the GPU is that, over time, it has become increasingly programmable, to the extent that it can run a variety of programs, many unrelated to graphics, much faster than the CPU. This created the movement that is now known as GPGPU or General Purpose Computing on Graphics Processing Units.

## MOVING ON UP

The GPGPU movement did not come about overnight. Three key innovations made GPGPU possible. The release of high level shading languages, first with NVIDIA's Cg, then Microsoft's HLSL and OpenGL's GL Shading Language made GPU programming accessible to the ordinary

programmers. Vastly expanded GPU programmability, especially from Shader Model 3.0, brought support for loops, branches, large instruction counts and the 32-bit floating point data format. This allowed the GPU to mirror almost all of the functionality of the CPU. And finally is the adoption of PCI Express, which gave the GPU a high-bandwidth interface to write results back to main memory, something that AGP could never do.

## WHAT'S THE PURPOSE?

The purpose of this article was to survey the current landscape of GPGPU applications. But as we started to learn about all the research efforts under way, it became clear that there were not just a handful of GPGPU applications, but a whole smorgasbord. Physics acceleration, global illumination, protein folding, neural nets and SQL queries can all be accelerated on the GPU. Even something as remote as stock options pricing has been made to run on the graphics processor. To find out how the GPU became so versatile, let's take a look at how GPGPU actually works.

## GPGPU PROGRAMMING

Let's suppose we want to write a GPGPU program to find the sum of 1024 numbers stored in memory. In order for the GPU to get to work, we first have to copy these numbers into the graphics memory. Tempting as it may be, you can't just dump an Excel spreadsheet in there – it has to be in a format the graphics processors understand, in this case, a texture.

To find the sum we need to devise an algorithm that will run in a parallel



fashion. If we simply write a program to add the numbers one at a time, the calculations will end up on one pipeline. In order to use all the pipes, we need to break up the problem into independent parts. One way is break up the 1024 numbers as 512 pairs. We take each pair and add them, storing the 512 results. We then take the 512 numbers and add them again, storing the 256 results. In this way, we'll eventually converge to one pair whose sum will be our result. Breaking up the workload into independent parts and finding a parallel algorithm is the key to exploiting the GPU.

For the highest performance, such a program should be written in to use the pixel processors, as there are more pixel than vertex processors. The execution involves every stage of the graphics pipeline. The vertex processor maps our texture onto a rectangle. The rasteriser takes the rectangle and converts it to fragments. The pixel processor then computes the sum, storing the result as a new texture half the size of the original. The process repeats itself using the smaller texture until the texture is reduced to one element. That is our sum.

How about performance? A GPU like the RADEON X1900 XTX can execute 384 add operations per cycle using its pixel processors alone. A Core 2 Duo Extreme, even when using all its SIMD units, can only do 16. Even when we factor in the 4.5x clock speed difference, the RADEON is still 5.2 times faster.

The above example is essentially how GPGPU programs work. Program data is expressed as textures. The calculations are done by the vertex and pixel processors. In turn, the results are written back as textures.

#### GPU PHYSICS

One of the most exciting GPGPU applications is game physics acceleration. Early this year, following AGEIA's PhysX launch, Havok and NVIDIA announced GPU based physics acceleration using the new Havok FX API. The new API allows for what is known as 'effects physics' to be run on the GPU.

Effects physics is different from the more general gameplay physics supported by AGEIA's PhysX board. Effects physics make the world look more interesting through particles, fog and fluid simulation but it won't affect the outcome of the game. It is more akin to physics-based graphical effects. Gameplay physics on the other hand is about applying physics to elements of the gameplay. So while effects physics can make the ocean look alive by adding waves and particles, gameplay physics will calculate the force of the waves and apply it to elements of the game.

Although gameplay physics allows for greater interaction, effects physics is also important for realising greater visual richness. Its greatest advantage is that it can simulate much larger scales. According to Havok's Vice President of Product Management Jeff Yates, effects physics can simulate 10 times as many non-critical objects and particles than a gameplay physics system.

Depending on who does the benchmarks, effects physics on the GPU is said to be more than 10 times faster than a CPU implementation. ATI



ATI – leading the way on GPGPU with its physics solution demoed at this year's Computex.

has even gone as far as to claim that its RADEON X1900 XTX runs physics nine times faster than AGEIA's PhysX board. We don't know how ATI arrived at this number as the RADEON and PhysX share no common API.

Havok has announced physics support for both ATI and NVIDIA graphics processors. Games developed using Havok FX are expected to arrive at the end of the year. The system will by default share the physics and graphics processing on one GPU. If you're fortunate enough to own a dual-

GPU system, the API can offload the physics to the second GPU, using it as effectively a dedicated physics accelerator. ATI has even demonstrated a three GPU system, rendering graphics in CrossFire mode with two GPUs, while using the third for physics.

## 'Windows Vista more than any other tech will bring GPGPU out of academic circles and into the mainstream.'

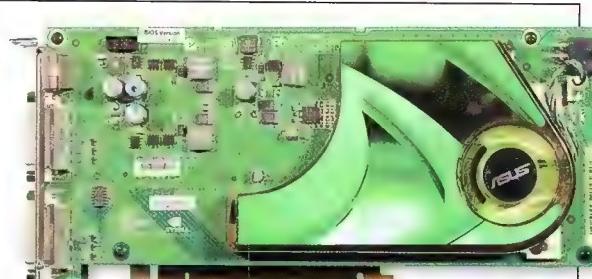
#### GLOBAL ILLUMINATION ON THE GPU

Outside of physics, the coolest GPGPU application would have to be global illumination. Although there are countless game engines in the market place, they all use the same core rendering algorithm – rasterisation. Rasterisation is incredibly fast and deserves full credit for bringing about interactive graphics.

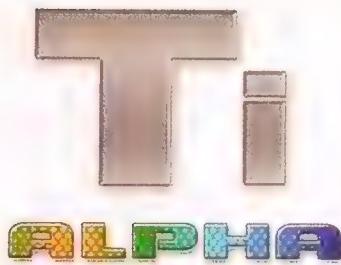
However, for photorealism, it is an awful hack.

Raytracing, radiosity and photon mapping are fundamentally different algorithms for rendering graphics. Falling under the umbrella term global illumination, these algorithms actually model the way light behaves as it bounces around the world. For example, in photon mapping, the rendering begins with each light source shooting out a number of photons. These are then allowed to bounce around the environment, leaving a portion of their energy behind at each bounce. When every photon has exhausted its energy, the scene is lit and the rendering is complete.

Global illumination (GI) produces luscious images at agonisingly slow speeds. So far, only clusters have managed to run GI scenes at interactive speeds. A research group at Saarland University in Germany produced a raytraced Quake 3 engine that ran on a cluster of 20 Athlon XP 1800s at 20 frames per second. Similar groups have adopted other GI algorithms on SGI and Linux clusters.



Who knows what the future has in store for hardware like NVIDIA's GeForce 7950. Could certain tasks be offloaded to one of the GPUs, while the other handles graphics rendering? We'll have to wait and see.



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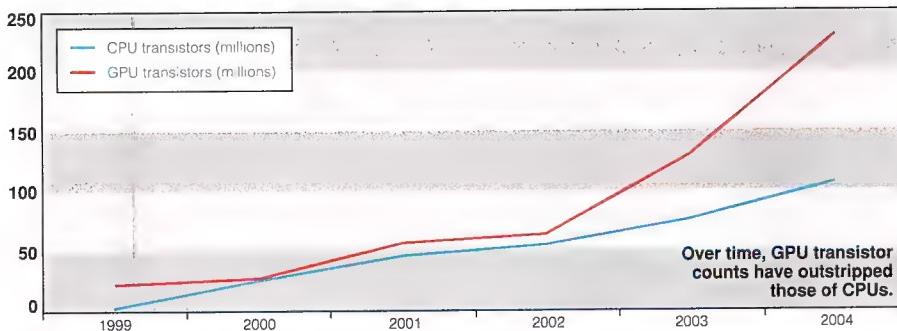


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	Intel Core 2 Duo X6800	ATI RADEON X1900 XTX
Clock speed	2.93GHz	650MHz
Floating point hardware	2 FPU 3 SSE	8 vertex processors 48 pixel processors
Theoretical floating point performance	47 gigaflops	416 gigaflops

Above GPU &amp; CPU floating point performance.

Because global illumination is so sought after, efforts to port it to the GPU have been under way since the GeForce 3. Raytracing, radiosity and photon mapping have all been made to run on the GPU with varying degrees of quality. So far, few have managed to run at interactive speeds. A scene with about 10,000 elements can be rendered in realtime using radiosity on the GPU. Photon mapping is a bit slower, taking a few seconds to render each frame.

The good news is that most of the work was done on early hardware like the GeForce FX 5900. No paper has mentioned SLI acceleration. With next generation graphics processors, especially in dual or quad configurations, we can expect to see the first interactive global illumination demos on the GPU.

## VISTA, THE ULTIMATE GPGPU PLATFORM

Just how far will GPGPU go? A breakthrough is due early next year with the release of Microsoft's next operating system, Windows Vista. This, perhaps more than any other technology, will bring GPGPU out of academic circles and into the mainstream.

Windows Vista will expose the GPU for all applications to use. Currently the GPU is viewed as a single resource. Vista will represent the GPU as a virtual device that can be time-shared by many applications. Like current CPUs, the graphics processor will then handle multiple threads and switch between them to give the illusion of running multiple programs.

Another major change is that the graphics processor's memory will be fully virtualised. This means the graphics card will no longer be limited to its onboard memory but gain full access to the system memory. For GPGPU applications, this will allow much larger data structures. For games this will mean much richer content.

Windows Vista will introduce Direct3D 10. Current GPGPU applications spend a lot of their time working around various quirks in the hardware. Basic issues such as integer number support, GPU sorting and data structures take up a huge amount of processing time.

CPU	GPU
Arrays	Textures
Loops	Shader programs
Memory read	Texture sample
Memory write	Render to off-screen buffer

Above GPU and CPU programming models.

However, with Direct3D 10, some of these problems simply disappear.

Direct3D 10 presents a unified shading language for all shading processors. Instruction limits for shader programs are abolished. A new stream output function allows results to be written into memory without resorting to pixel processors. And full integer support is added. These changes remove much of the current burdens in GPGPU programs.

With the release of Windows Vista and Direct3D 10 hardware you can expect to see a host of desktop applications tap into the power of graphics processors. Every program that is currently taking advantage of the SIMD unit of the CPU should enjoy a significant speed-up when accelerated by the GPU.

A potential killer app is a GPU accelerated version of Photoshop. Currently, the filters in Photoshop are essentially pixel shaders. But as they run on the GPU, each filter takes a few seconds to execute. Using the graphics processor, they can run at interactive speeds. This would also have the benefit of sending Photoshop benchmarks to the grave.

Media encoding is also a perfect match for the GPU. Most audio and video encoders today use some form of SSE optimisation.

As graphics processors provide more SIMD power than CPUs, GPU media encoders should be lightening fast.

## TOP 5 GPGPU APPLICATIONS FOR THE PC

- 1 Physics acceleration
- 2 Database operations
- 3 Global illumination
- 4 Realtime Photoshop filters
- 5 GPU accelerated audio and video encoding

## A VERY GENERAL FUTURE

Today, we are still in the infancy of GPGPU development. With Windows Vista, the graphics processor's prestige has been elevated to a new level. It is undeniable that CPUs have caught up immensely in recent months. The new multi-core approach will allow CPUs to scale the number of cores as GPUs have scaled the number of pipelines. This will close the transistor gap between the two processors. But the floating point gap will remain, and with it, the motivation for GPGPU.

The next generation of graphics processors will bring unprecedented freedom to GPGPU programs. The CPU may have declined, but the GPU lives on!

GPGPU

# ATOM CLANCY'S SPLINTER CELL DOUBLE AGENT

PC  
DVD  
ROM

gameloft.com

YOU HAVE NO IDEA WHAT'S COMING  
OCTOBER 2006



Strong violence

© 2006 Ubisoft Entertainment. All Rights Reserved. Splinter Cell, Splinter Cell Double Agent, Sam Fisher, the Soldier Icon, Ubisoft and the Ubisoft logo are trademarks of Ubisoft Entertainment in the U.S. and/or other countries.



# HARDCORE

NEWS, REVIEWS AND ROUNDUPS ON THE LATEST HARDWARE TECHNOLOGY FOR YOUR BOX



**S**o you've finally purchased the latest and greatest 500W power supply and you're up the creek. This month we've gathered together three drives that could take you to the moon, and two more drives that can tell you where you're going well before you even start your engine. Best of all, there's some serious value here too. What's coming up, though? That's right, it's time to get serious about what's new in ASX-ONION. We've got a few surprises in store, and you'll be the first to know.

Something will catch our eye every week, from the new ATI X1600 544T FTB, to good old CRTs, to the latest in value add-ons. Check out what Dan has to say this month.

Pioneer Dreambook Power M57U, with what all seems to be the new Core 2 Duo processor, and in the Core 2 Extreme we have K8000+ P4W DH Deluxe motherboard and 6400 RAM, which looks like a lot.

What's new with the latest gear?

Now you can get your server equipped with Intel Dualband wireless network cards and put it through its paces. Also, how's the new ATI X1600 544T FTB? It's been known to be well on its way to becoming a legend. Welcome to ASX-ONION. We've got a few surprises in store, and you'll be the first to know.

It's good to be here. Whether it's Lian-Li, a brandy MAC or something else, keep it V.E.T. press.

We need you to see. At the X1600 544T FTB, we've got a few surprises in store, and you'll be the first to know. With ATI's release of their new X1600 544T FTB, we've got a few surprises in store, and you'll be the first to know. With ATI's release of their new X1600 544T FTB, we've got a few surprises in store, and you'll be the first to know.

## Win a Lian-Li PC-S80 case!

In the mood for a new case, or just like getting stuff for free, then look no further than this gorgeous Lian-Li PC-S80 case. It holds the answers to all your PC part-containing needs and is beautiful to boot. To be in with a chance to win visit [www.atomicmpc.com.au/complist.asp](http://www.atomicmpc.com.au/complist.asp).

**Q: How many 5.25" drive bays does the Lian-Li PC-S80 have?**



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Everything we do and everything we use to get those graphs and numbers you like.



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So many hard drives tested, your head will implode. And then explode.



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Gadgets galore at the Gearbox store. Not that it's a store, just two great pages in a magazine.



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### Kitlog

Our recommendations on the best bits for the best systems. Just figure out your budget.



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### Ground Zero

Dan Rutter talks about a lot of things. Find out what he's talking about this month.



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# BENCH MARK

How we test,  
what we test,  
when we test it

**3** DMark05 and 06 are the legs of our bench. As freely downloadable tools, they allow people all around the world to compete on a single platform, regardless of its indication of real world application, and its ability to keep our table stable.

On the gaming surface, Call of Duty 2 takes first honours in the FPS department. Quake 4 follows closely behind for our OpenGL benchmarks, taking over from where the venerable Doom 3 left off and offering multiple CPU optimisations. Half-Life 2 remains, its market penetration simply too huge to ignore. X3: Reunion makes an appearance, in an effort to have a benchmark that is not an FPS. In the same line, Splinter Cell: Chaos Theory has also been added. Other games do exist. Honest.

All tests are run at 1280x1024, 1600x1200 and 1920x1200 with vsync off, to cater for the most popular LCD resolution, CRT resolution and those who own widescreen monsters respectively.

To hit the CPU, we use LAME MT, a multithreaded version of the popular MP3 encoder, which is used to compress a standard 30-minute WAV file. Similarly, VirtualDubMod is used to compress a standard 1GB raw video file into XviD at 1300Kb/s. Other CPU specific tests in our stable are Maxon's CineBench and SuperPi Mod. Rounding out the suite, SiSoftware's Sandra tests several subsystems across the board, while HDTach and ATTO Disk Benchmark helpfully provide hard drive scores.

All these tests are run on a Windows XP SP2 platform, running the latest official drivers available. Every test is run three times to eliminate any oddities that may crop up along the way, the final result printed in the magazine being an average of those scores.

Of course, all this is pointless without a standard set of hardware, and as such it is laid out below for the world to see. On with the testing!



The Atomic Hot Award is given only to the best. In our roundups, we differentiate the best further using the following awards:

**VALUE AWARD** This means the product is the best buy price-wise.

**PERFORMANCE AWARD** Price isn't a big factor - it just has to make our benchmarks burn and our eyes water.

**EXTREME AWARD** Forget everything. If it's mind-blowingly amazing, then it'll get an Extreme Award.

## BENCHMARKS

### Graphics

#### 3DMark05

Game tests only, 4xAA, 8xAF  
[www.futuremark.com](http://www.futuremark.com)

#### 3DMark06

Game tests only, 4xAA, 8xAF (SM2.0), 8xAF (HDR/SM3.0)  
[www.futuremark.com](http://www.futuremark.com)

#### Half-Life 2

Canals custom timedemo, 4xAA, 8xAF, all details highest, HDR off  
[www.half-life2.com](http://www.half-life2.com)

#### Splinter Cell: Chaos Theory

Lighthouse Demo, Shader Model 3.0, 8xAF, shadow resolution high, all features on  
[www.splintercell3.com](http://www.splintercell3.com)

#### X3 Rolling Demo

High settings, auto quality control disabled, glow enabled, 4xAA, 8xAF  
[www.egosoft.com/games/x3/info\\_en.php](http://www.egosoft.com/games/x3/info_en.php)

#### Call of Duty 2

Hill 40 – Defend custom timedemo, 4xAA, 8xAF, all options highest  
[www.callofduty2.com](http://www.callofduty2.com)

#### Quake 4

High quality, 4xAA, 8xAF, Multiple CPU support, all options highest  
[www.quake4game.com](http://www.quake4game.com)

### Subsystems

#### HDTach

[www.simplisoftware.com](http://www.simplisoftware.com)

#### LAME MT

[softlab.technion.ac.il/project/LAME/html/lame.html](http://softlab.technion.ac.il/project/LAME/html/lame.html)

#### VirtualDubMod

[virtualdubmod.sf.net](http://virtualdubmod.sf.net)

#### SuperPi Mod

[www.xtremesystems.com/pi](http://www.xtremesystems.com/pi)

#### Cinebench

[www.cinebench.com](http://www.cinebench.com)

#### SiSoft Sandra

[www.sisofware.co.uk](http://www.sisofware.co.uk)

#### Everest

[www.lavalys.com](http://www.lavalys.com)

### Others

#### DisplayMate

[www.displaymate.com](http://www.displaymate.com)

#### ATI Tool

[www.techpowerup.com/atitool](http://www.techpowerup.com/atitool)

#### RivaTuner

[www.guru3d.com/rivatuner](http://www.guru3d.com/rivatuner)

#### FRAPS

[www.fraps.com](http://www.fraps.com)

#### CPU-Z

[www.cpuid.com](http://www.cpuid.com)

#### Stress Prime 2004

[sp2004.fre3.com](http://sp2004.fre3.com)

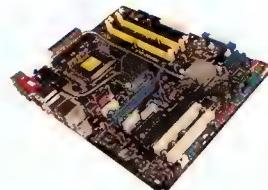
## ATOMICBENCH

intel



▲ Intel Pentium 955 EE

ASUS



▲ ASUS P5N32-SLI Deluxe

OCZ Technology



▲ 2GB OCZ PC2-4200EB

Western Digital



▲ Western Digital 1500ADFD

PC Case Gear



▲ Seasonic S12 600W

AMD



▲ AMD Athlon 64 FX-60

ASUS



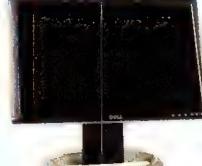
▲ ASUS A8N32-SLI Deluxe

OCZ Technology



▲ 2GB OCZ PC-4000EB

DELL



▲ Dell 2405FPW

Albatron



▲ Albatron 7900GT

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VICTORIA YNNEX 1300-100-100  
(TOLL-FREE)  
RECTRON 03-9561-6166

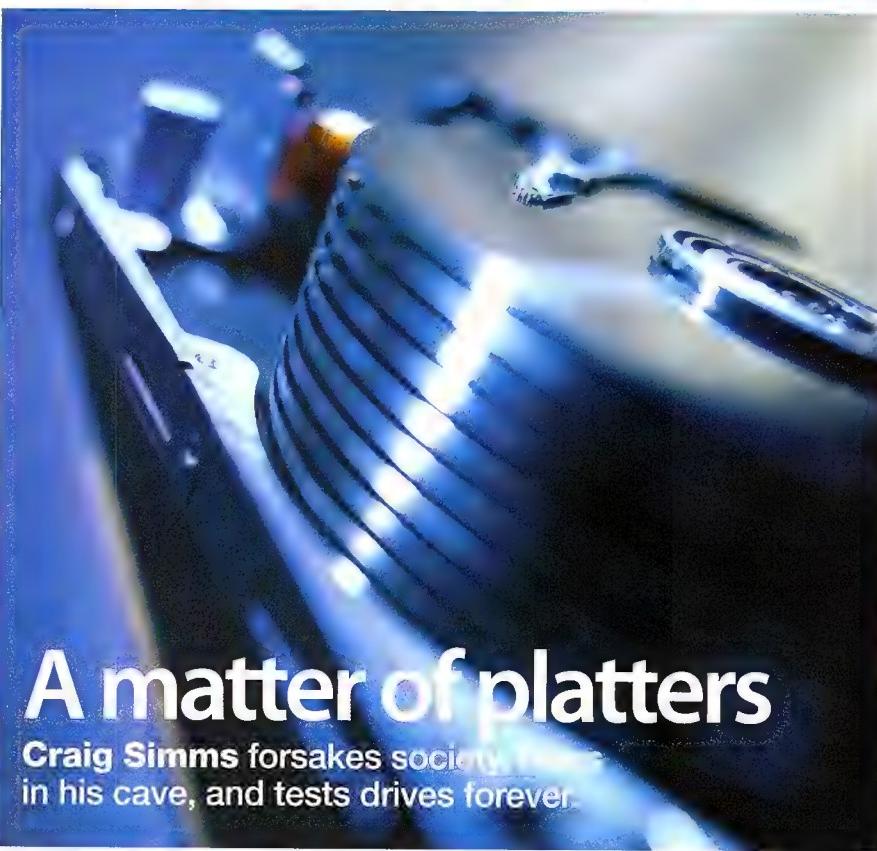
New Zealand

Black Diamond Technology LTD 0800-439439  
Checksum New Zealand LTD 64-9-579-8838  
Ingram Mirco NZ LTD 64-9-574-2500

# HEAD TO HEAD

Bite-sized comparative  
roundups of the  
hottest gear

HEAD TO HEAD



## A matter of platters

Craig Simms forsakes society  
in his cave, and tests drives forever

You need storage. How else would you store all the pr0n from the Internet? Anything above 320GB is prohibitively expensive though, and everybody repeats again and again the phrase 'I'll never buy a [insert brand here] hard drive again'. Yet it's always a different brand from person to person, so we figure the failure rates are probably pretty similar. Besides, MTBF (Mean Time Before Failure) is such a laugh – 1.2 million hours before failure? That's just shy of 137 years. We think the drive will die before then. So how do we select a drive?

Performance is the ticket – that and warranty. And there, *Atomic* can help. We gathered up the most beastly drives, but kept it cost effective by limiting the capacity to 320GB. We then went certifiably nutters on them to see what they could do in the *Atomic* test bench.

## Features

Hard drives come with some pretty nifty features these days to make the experience a whole lot more pleasant. Let's take a quick tour.

### S.M.A.R.T.

Self Monitoring Analysis and Reporting

Technology – if a drive is S.M.A.R.T. enabled (which they pretty much all are these days), it can report on its own health, and if certain aspects are exceeding set tolerances. This gives you an adequate warning to back up before a drive dies.

fact that the system could only handle 28-bit addressing. This limited the capacity to 268,435,456 sectors of 512 bytes – 137.4GB (the evil unformatted kind, not the 1024KB we know and love). By increasing this to 48-bit addressing, the limit is increased to 27,343,750,000,000 sectors of 512 bytes, or 144PB. Yes, petabytes. Older systems may need a BIOS or OS update to support these drives.

### Read look-ahead

The hard drive is capable of reading the data most likely to be requested after the current set of data, storing it in the look-ahead buffer.

### Write cache

This little gem allows some nice performance increases. It's essentially the opposite of read look-ahead, allowing the drive to store expected data in a cache for later writing to the disk. Mind you, if the data is still in the cache and there's a sudden system failure, you lose that data forever. The cause of many a write error thanks to Windows in the past, this is now a solid part of the technology.

### Host protected area

If the BIOS supports it, a portion of the hard drive can be put aside to store the Core Management Environment (CME), an open platform developed by Phoenix. Being controlled by the BIOS, the CME is immune to virus attacks so if an OS gets taken down, useful tasks such as running a built-

### 8-bit address

Not so long ago, the hard drive hit the 137GB hurdle, which was unpassable due to the

HD Tune 2.52 - Hard Disk Utility					
ST340014A (40 GB)		46 °C		Exit	
ID	Current	Worst	Threshold	Data	Status
(01) Raw Read Error Rate	72	63	6	90754793	Ok
(03) Spin Up Time	98	98	0	0	Ok
(04) Start/Stop Count	100	100	20	6	Ok
(05) Reallocated Sector Count	100	100	36	0	Ok
(07) Seek Error Rate	88	60	30	735304...	Ok
(09) Power On Hours Count	91	91	0	8362	Ok
(0A) Spin Retry Count	100	100	97	0	Ok
(0C) Power Cycle Count	97	97	20	3550	Ok
(C2) Temperature	46	50	0	46	Ok
(C3) Hardware ECC Recovered	72	63	0	90754793	Ok
(C5) Current Pending Sector	100	100	0	0	Ok
(C6) Offline Uncorrectable	100	100	0	0	Ok
(C7) Ultra DMA CRC Error Count	200	200	0	0	Ok
(C8) Write Error Rate	100	253	0	0	Ok
(CA) (unknown attribute)	100	253	0	0	Ok

Power On Time: 8362

Health Status:

Ok

▲ S.M.A.R.T. lets you see if there's a problem developing, so you have time to back up your data.

in virus scan, hardware diagnostics, executing system restore or gaining Internet access can be enabled through the CME.

## Device configuration overlay

Allows the systems to modify the apparent features of a hard drive. This could be used, for example, to hide a secure partition from the OS. It can also be used to alter the commands, features and modes supported by the drive.

## Power/advanced power/interface power management

All offer different times and features of when the drive can be throttled or spun down. The more of the above features your drive has, the less power it will consume over time, and the smaller your power bill will be.

## Automatic acoustic management

Optional, it reduces the seek noise at the cost of a small performance hit.

## Power-up in standby

Allows devices to be powered up letting the host to determine when they actually spin up – this allows many drives to be run on a low power system, and makes multi-drive systems more power efficient.

## Security mode

Password protect your disk, allowing both a user and master password.

## NCQ

Native Command Queuing is an internal queue that allows the hard drive to reorder and reschedule commands in a way that is more efficient for the heads to carry out.

## HD Tach RW version 3.0.1.0



[www.simplissoftware.com](http://www.simplissoftware.com)

Select Storage Device      Refresh

(C:) ST340014A 8.01 (40.0GB)

- Quick bench (8mb zones)
- Long bench (32mb zones)
- Full bench (variable zone, see docs)

Enable Write Test

[Run Test](#)

[Graph Data](#)

[Check Updates](#)

[Online Help](#)

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▲ HDTach is the benchmarking tool of choice.

## Notes

Let's face it, a hard drive is a little box and usually, you plug it in and it works. There are a few nuances though between brands, which are interesting to note – for one, Seagate drives ship with a jumper that needs to be removed to enable SATA 3Gb/s. Conversely, Samsung and Western Digital drives ship at a default SATA 3Gb/s, requiring the jumper to be added to step them down. Hitachi is a pain to enable SATA 3Gb/s on, requiring the computer to be booted into DOS mode and switched through a program called 'Feature Tool'. An ISO and floppy disk image are provided on its site. Fortunately Feature Tool also allows a few other funky features, like setting the level of acoustic management.

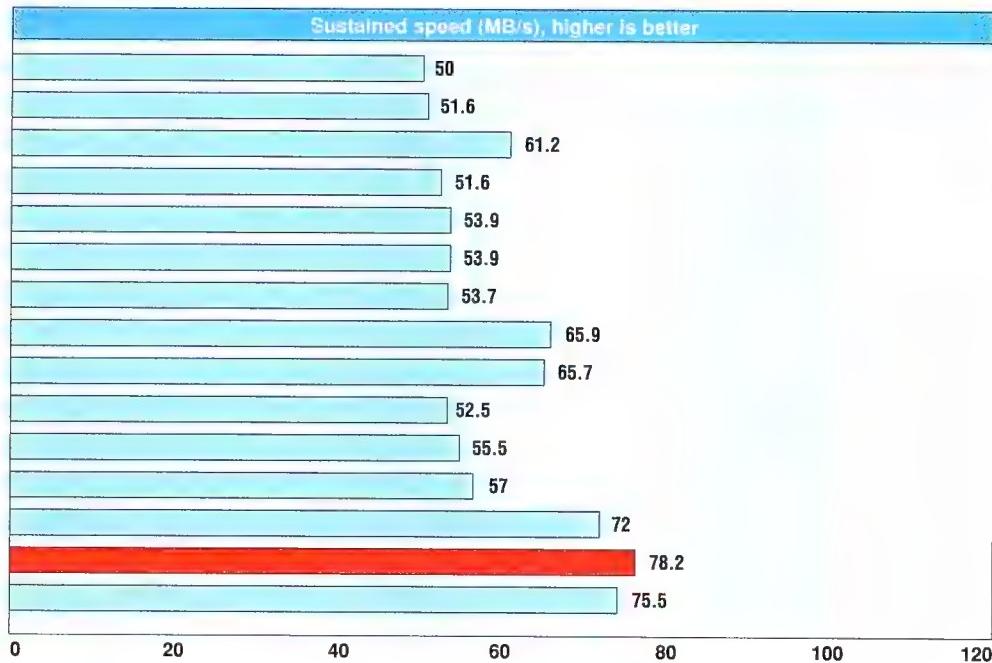
You'll also notice Western Digital has

silently updated its smaller capacity Raptors to reflect new technology, and Seagate's drives use perpendicular recording. So now you know.

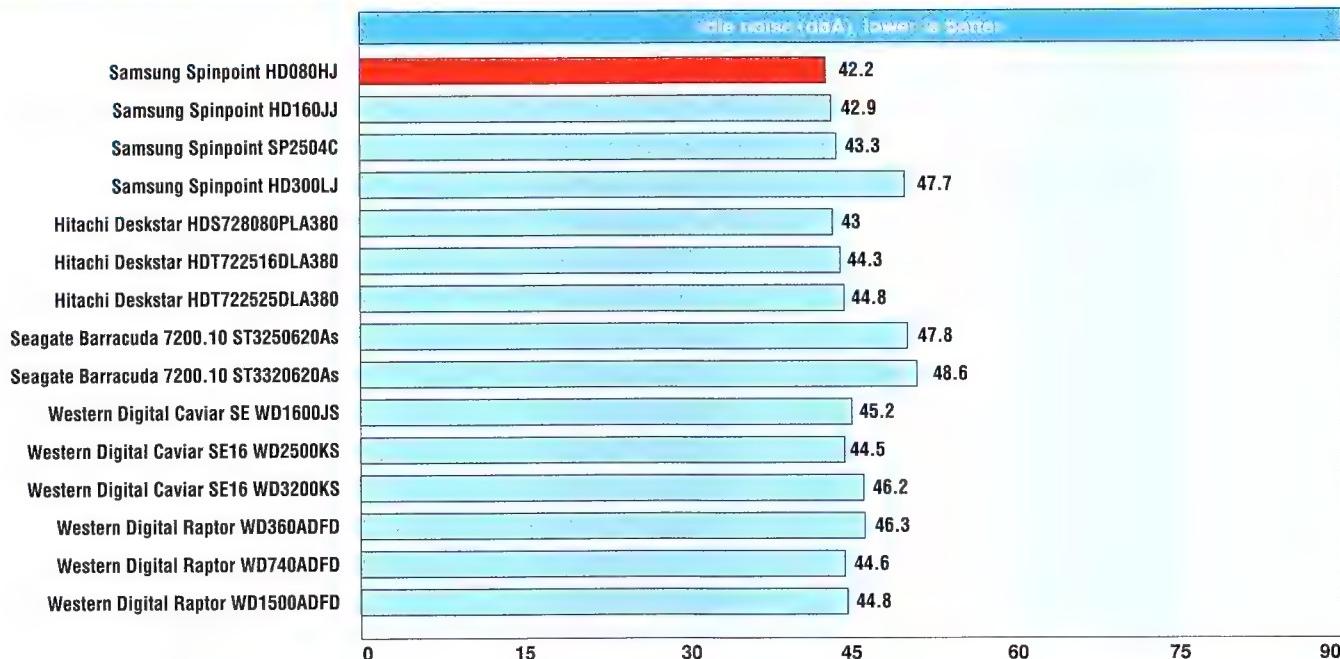
## How we tested

Hooking the hard drives one by one into the nForce controlled SATA ports on our A8N32-SLI Deluxe, we ran them through the 32MB zones long bench on HDTach to grab the burst and sustained read speed. We then ran a simultaneous suite of Passmark's BurnInTest, HDTach and HD Tune to strain the drive, measuring its peak volume with a Digitech QM1588 sound level meter. Ambient volume was 37.9dBa.

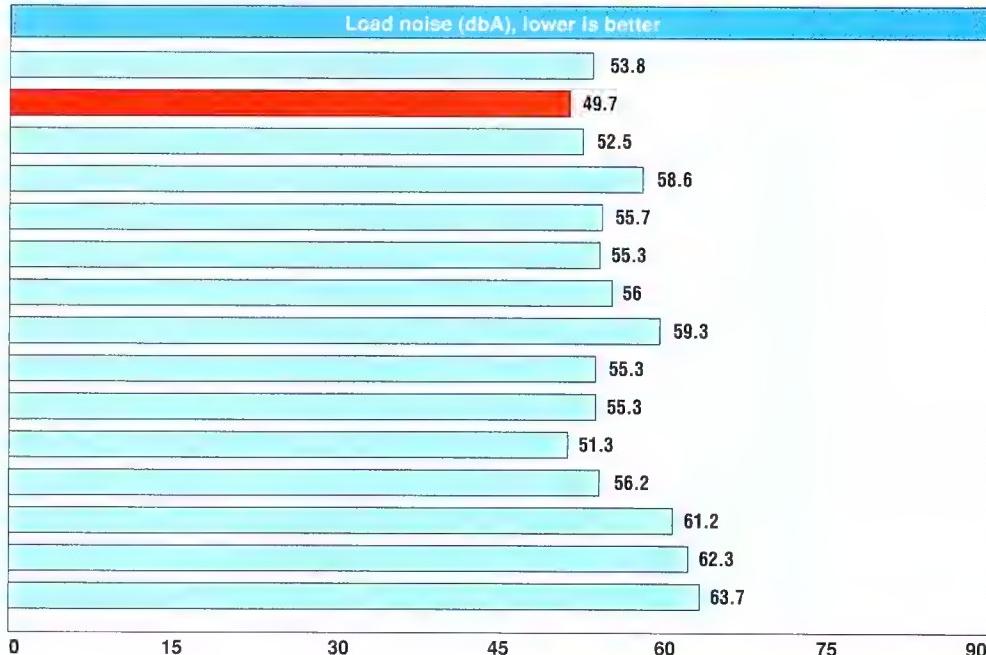




Name	Western Digital Caviar SE16 WD3200KS	Western Digital Caviar SE16 WD2500KS	Western Digital Caviar SE WD1600JS	Western Digital Raptor WD1500ADFD	Western Digital Raptor WD740ADFD	Western Digital Raptor WD360ADFD	Seagate Barracuda 7200.10 ST3320620As
Supplier	Western Digital	Ingram Micro					
Website	<a href="http://www.westerndigital.com">www.westerndigital.com</a>	<a href="http://www.ingrammicro.com.au">www.ingrammicro.com.au</a>					
Advertised capacity (GB)	320	250	160	150	74	36	320
Formatted capacity (GB)	298.1	232.9	149.1	139.7	69.2	34.5	298.1
Price	\$169	\$129	\$99	\$429	\$259	\$179	\$190
RPM	7200	7200	7200	10,000	10,000	10,000	7200
Buffer (MB)	16	16	8	16	16	16	16
SATA standard (150/300)	300	300	300	150	150	150	300
Warranty (Years)	3	3	3	5	5	5	5
Advanced power management	No	No	Yes	No	No	No	No
Interface power management	Yes	Yes	Yes	No	Yes	Yes	No
Automatic acoustic management	Yes	Yes	Yes	Yes	Yes	Yes	No
Power-up in standby	Yes	No	No	Yes	Yes	Yes	No
NCQ	Yes	No	No	Yes	Yes	Yes	Yes



Seagate Barracuda 7200.10 ST3250620As	Hitachi Deskstar HDT722525DLA380	Hitachi Deskstar HDT722516DLA380	Hitachi Deskstar HDS728080PLA380	Samsung Spinpoint HD300LJ	Samsung Spinpoint SP2504C	Samsung Spinpoint HD160JJ	Samsung Spinpoint HD080HJ	
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<a href="http://www.ingrammicro.com.au">www.ingrammicro.com.au</a>	<a href="http://www.legend.com.au">www.legend.com.au</a>	<a href="http://www.legend.com.au">www.legend.com.au</a>	<a href="http://www.legend.com.au">www.legend.com.au</a>	<a href="http://www.altech.com.au">www.altech.com.au</a>	<a href="http://www.altech.com.au">www.altech.com.au</a>	<a href="http://www.altech.com.au">www.altech.com.au</a>	<a href="http://www.altech.com.au">www.altech.com.au</a>	
250	250	160	80	300	250	160	80	
232.9	232.9	153.4	76.7	279.5	232.9	139.7	74.5	
\$160	\$169	\$129	\$99	\$169	\$139	\$115	\$88	
7200	7200	7200	7200	7200	7200	7200	7200	
16	8	8	8	8	8	8	8	
300	300	300	300	300	300	300	300	
5	3	3	3	3	3	3	3	
No	Yes	Yes	Yes	No	No	No	No	
No	Yes							
No	Yes							
No	Yes	Yes	Yes	No	No	No	No	
Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	



## The missing contenders

### Where's Maxtor?

After the buyout from Seagate, it has been decided that Maxtor's current spate of internal drives will be its last, the once mighty company being relegated to providing 'branded solutions' – marketing speak for external drives. Rumour down the grapevine though, has it that the DiamondMax range may get a new breath of life... some perpendicular refreshes perhaps?

### Where's Seagate?

So there are only two Seagate drives here. We asked for more, but it seems the world's biggest hard drive company can't get its act together to send them along for review – we can only assume the kibosh was put down because the other drives we requested (80, 160GB) weren't the brand spanking new perpendicular 7200.10s, as the capacities were only available in the older 7200.9 variety. Still, an unexpectedly poor showing from Seagate. A big thanks to Ingram Micro who stepped in and got us the drives present in the round up.

## Conclusion

Finding a balance between sustained speed, quietness and to a lesser extent, burst speed is a tough one, and to that end we have four winners – one each for silence, sustained speed, burst speed and overall.

### Honourable mention

Before we get into the awards proper, there must be an honourable mention here – the Hitachi drives supported all available features, and sported the most customisability through Feature Tool, making them ideal to use in a home server environment when saving power is desirable.

or if you need something extra special out of your drives. Sitting right down the middle in terms of performance, these drives would be equally as happy sitting in your Grandma's PC or your own gaming system.

### The quiet one

The Samsung Spinpoint 160GB drive definitely takes the cake for overall quietness while still delivering a decent capacity. We invited the boys from *PC Authority* in to see if they could tell which drive we were testing, but in the face of nothing but silence, they couldn't. If you want to sleep at night with the PC powered up, couple this with a Seasonic PSU, GeForce 7900GTX or silent GPU and a Scythe Ninja with a 120mm Nexus fan. You'll barely know your PC is on. Amazing bliss, how sweet the sound.

### The marathon runner

For raw sustained speed you can't go past the refreshed 74GB Raptor. No surprise that it's almost the noisiest of the lot then. Really, the other Raptors are within the margin of error here, so take your pick.

### The sprinter

For burst speed, Seagate's Barracuda 320GB wipes the floor clean with everyone else, its sustained reads the closest a standard drive can be to the almighty Raptors.

### The winner

Overall is a little trickier – here we took capacity into account as well, and across the board the Seagate 320GB Barracuda takes the cake again for sheer value and performance by a considerable margin, despite missing a number of power saving features. For this reason, we can happily call the Seagate 7200.10 320GB the king of the hill.

### The future

For many years we've been told that magnetic storage is approaching its limit, and a new technology will have to replace it if we are to meet the exponential needs of consumers. Despite this, Hitachi is already claiming there'll be a terabyte drive by the end of the year, although it won't hit distribution channels until 2007. You can bet others will follow with great vigour.

Then there's the integration of flash memory into magnetic drives (hybrid drives, or HHDDs), a feature supported in Vista, with the intent of speeding up boot times. Samsung already has a working unit, although it's only in a notebook form factor at this stage. Other advantages of using flash include reduced power consumption due to the lack of moving parts, resistance to shock and reduction on wear and tear of the magnetic disk, by using the flash as a cache and only writing to the disk when it is most efficient or absolutely necessary.

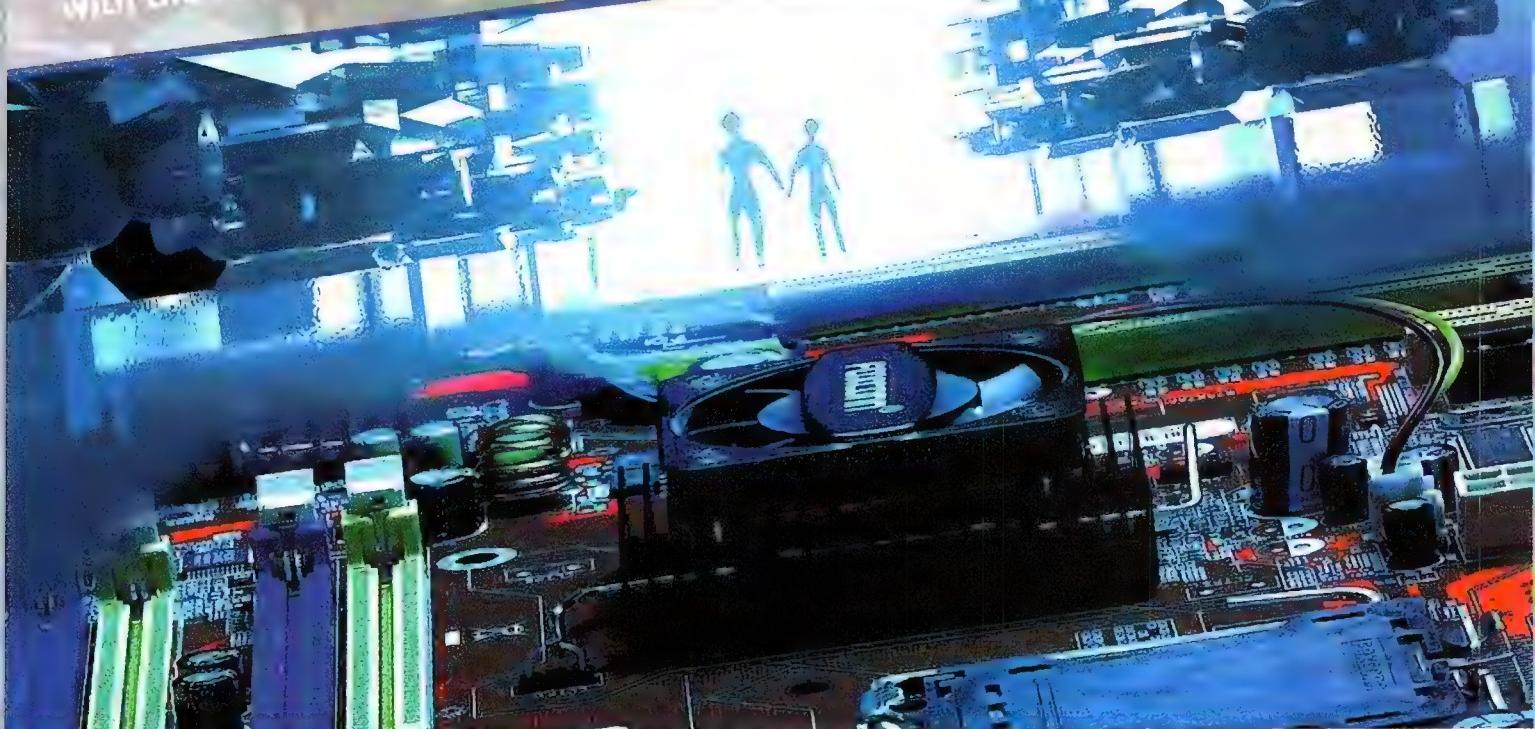
Of course flash memory has a low life span – about one million read/write cycles. However we're assured that the problem will be sorted out, or at least worked around by the time the drives hit the market proper.

When will we get to see true solid state devices? Overlooking Gigabyte's i-RAM, a 32GB solid state Samsung drive (NAND flash) is on the way for notebooks, but with no indication of cost – expect it to be considerably higher than magnetic storage.

If you want a real SSD though, you'll want something like a RAMSAN-400 with 128GB of storage with 3GB/s of sustained transfer. For that, you're looking at about \$330,000. Looks like we're still waiting.

# NOW SELLING DAY A PC NEAR YOU

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- Intel® Clear Video Technology (Intel® CVT) support
- Improved™ 3D graphics support with Intel GMA x 3000



P9657AA-8EKRS2H



- FOXONE-Enhanced Overclocking
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- Best feature selection made for overclockers.



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# GEAR

## Robot Soccer

Supplier Tesora

Website

[www.tesora.com.au](http://www.tesora.com.au)

Price \$59.95

Okay, so sport isn't healthy. It's likely to cause shortness of breath, bodily pain, muscle development, and possibly make you more attractive – everything a geek doesn't need. But that doesn't mean you can't enjoy sport, right? That's why they invented TV, video games, and in this case, remote controlled soccer robots. Why play sport when cute little bulbous minions can do it for you?



## HP 39gs Graphing Calculator

Supplier Hewlett Packard

Website [www.hp.com](http://www.hp.com)

Price \$179

Meet the mother of all calculators. This baby can talk smackematics with the best of them. There's the larger-than-average mono LCD, 200KB of memory for storing all those variables, and functions to compute polynomials, find derivatives, plot graphs and solve world hunger. Don't think this is simply the 'Deluxe' model of your scientific Casio. Only the hardcore need apply. Heck, it comes with a 100+ page manual!

## SP-7000 Superman Mouse

Supplier Anyware Website [www.anyware.com.au](http://www.anyware.com.au)

Price \$29.95

For a product to be endorsed by Superman himself, it needs to be supremely super. Is this the Supermouse? It does the mouse business pretty well. Tracks smoothly, has a very comfortable design and at 800DPI is plenty accurate enough for most uses. The thumb buttons annoyed us a bit, being positioned right where your thumb rests. Logitech's at least put the thumb buttons on a little ridge to help you avoid accidentally hitting them. For 30 bucks it looks the goods. The 'S' is moulded, inlaid plastic, not a plain, old sticker. Would make an excellent Father's Day present.

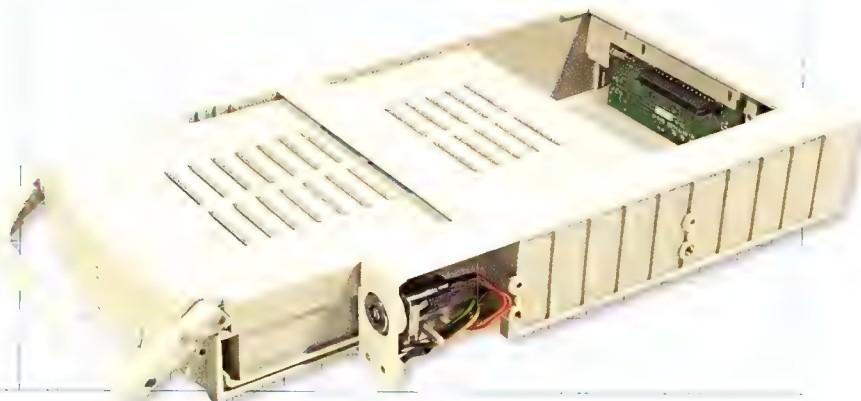


## Connectland Mobile SATA Rack

Supplier PC Case Gear Website [www.pccasegear.com.au](http://www.pccasegear.com.au)

Price \$16.50

If you like to pretend you live in a server room but don't have the liquid assets to back it up, then you could do worse than to grab yourself this purdy mobile SATA rack. Mind you, you'll need more than one of these if you want to caddy a drive between machines – but then if you were pretending you lived in a server room, you'd have several of them anyway. Or maybe you could use it as a really primitive way to boot up different operating systems in a flash, or quite possibly you could hold it in front of your mouth and pretend you're a Transformer.





### ▲ Thermalright HR-05

Supplier Altech

Website [www.altech.com.au](http://www.altech.com.au) Price \$45

In case you weren't convinced enough that PCs look like a small city when you zoom your eyes over them X-Wing on Death Star style, then why not add more towers to complete the picture? The HR-05 sits happily on your chipset, making the board's landscape more daunting and impressive. Whack on a CPU Tower cooler as well for the finished effect. Even if you only own a 286, your friends will be mighty impressed by the ridiculously high end cooling inside.

### ▲ Lacie 8GB Card

Supplier Lacie

Website [www.lacie.com.au](http://www.lacie.com.au)

Price \$270

Lacie claims this bright orange 8GB storage device is credit card sized – as it turns out it is, but only in width and height. The depth makes it difficult at best to fit inside any wallet. Still, it's nice to have 8GB to port around anywhere you like – heck, you could fit most DVDs on it if you had to. We're not entirely sure why it needs the big silver block in the middle – maybe if you're stuck in the middle of nowhere and need something to scratch directions on to.

### ▲ Kableflags

Supplier PC Case Gear

Website [pccasegear.com.au](http://www.pccasegear.com.au)

Price \$9.90

No matter how finely you organise cables behind a desk, somehow they manage to tangle into a mess more scary than Bill's pubes. If you don't feel like tracing a cable all the way from one end of its termination to the other, then you can label it with a KableFlag – either by buying a pre-labelled set for computers or home theatre, or a blank kit so you can write your own stuff on it with a permanent texta.

### Nexus Real Silent 120mm Fan ▼

Supplier PC Case Gear

Website [www.pccasegear.com.au](http://www.pccasegear.com.au) Price \$29.00

Nexus has a reputation for making the shooshiest fans around, so shooshy you'll think you're in a library of shooshers, shooshtificating like you've never heard shooshtification before. It's that shoostastic. (*I think you've killed the spellcheck now – Ed.*) While the 120mm used to be only available in perky orange, those with more austere tastes can now get the super silent bladed beauty in black, with bright white blades. Nexus is the centre of cooling.



# Samsung 244T

Samsung does it right the first time, says Craig Simms.

Price \$1600

Supplier Samsung

Website [www.samsung.com/au](http://www.samsung.com/au)

Specifications 24"; 1920x1200

resolution; S-PVA panel;  
HDCP; DVI; VGA; component;  
composite; S-Video; 2x USB;  
contrast ratio 1000:1; 500cd/m<sup>2</sup>.

**W**e like Samsung's way of doing things. All smiling, quiet and unsuspecting, it nods like an old man who's seen it all, among the brash young men showing off their strength in front of an awed audience. One of the young men shows off an impressive display to 'Oohs' and 'Ahs' from the crowd, then turns around and challenges the old master. Silence.

The wrinkly face smiles as the weathered arm puts down the walking cane, and that's the last thing the young man sees before his face hits the ground, dust flying up, wondering how the hell it happened. The old man nods, picks up his cane and shuffles away, smiling to himself.

This master is the Samsung 244T. It uses the same panel as the Dell 2407 (Samsung's own 8-bit LTM240M2), yet avoids the greyscale vertical gradient issues. The component works fantastically with the Xbox 360, the image noticeably sharper. The menu is easier to use. In fact the only substantial beef we can think anyone would have with the monitor is, next to Dell's aggressive styling, aesthetically it's a bit old hat. Not a 'wanderlust-destitute-hobo-with-bin-recovered-Maccas-in-one-hand' old hat, more of a 'Star-Trek-The-Next-Generation-was-once-futuristic-but-is-now-seemingly-out-of-place' style of old hat, yet still oddly cool.

Yes cool. Yes, even Wesley Crusher. 'Stop looking at me swan.'

The monitor can tilt, pivot, rotate and is height-adjustable, although it seems to sit a bit high at its default height. PIP is there for component, composite and S-Video, although it lacks the

'swap' feature found on the Dell, which allowed you to keep a handy eye on your Windows desktop while you played Xbox fullscreen.

Also missing is a hardware way to access 1:1, aspect ratio or fullscreen stretch scaling functions, leaving you to rely on your graphics card's control panel. This means if you hook up through component/composite/S-Video that you'll not be able to set the scale of the image, and will have to deal with it at fullscreen stretch.

Similarly absent is the card reader, which photographers would find handy. Apart from this, the screens are functionally identical.

The 244T happily ripped through the

DisplayMate tests, coping with all 255 shades, and provide immaculate colour ramps. Blacks were lovely, and as mentioned the green/purple streaking found in some vertical gradients on the 2407 simply wasn't present, much like panties in a swinger's bar.

While the 2407 takes on a slightly brown cast with its factory settings, the Samsung arrived slightly blue – so be sure to fiddle with the colour settings to find a more neutral cast.

Games and movies are superb, as to be

expected from the lower response time and vibrant colours – naturally you'll need some decent graphics grunt to run the latest and greatest at native 1920x1200, however if you've read this far, chances are this won't be a problem for you.

So between two identical panels, there's only three major points on which the Dell sets itself apart from the Samsung – it's a couple of hundred dollars cheaper, has a card reader and features a 14-day no questions asked return policy. The Samsung has better image quality, great component input and a promise of no dead pixels, ever.

With that in mind, we'll put a couple of hundred bucks on smiling old man Samsung for this round, and will wait to see what headstrong young Dell can come back with in the next.

**SCORE** **8.5** OUT OF 10



# Pioneer Dreambook Power M57U

Craig Simms dreams a little dream... book.

**Price** \$4917

**Supplier** Pioneer Computers

**Webs** [pioneercomputers.com.au](http://pioneercomputers.com.au)

**Specifications** Core 2 Duo T7200

2.0GHz; 17"; 7900GTX 256MB;

2GB DDR2 667 RAM; Hitachi 100GB

7200RPM HDD; Windows MCE

2005; Intel Pro Wireless; Express

card slot; Bluetooth; 3-year onsite

pick-up and return warranty.

**C**rossing the benches this month is Pioneer's (the computer company, not the sound/DVD burner company) Dreambook Power M57U – the high end spec of which is very close to Dell's monster XPS M1710 that we reviewed in *Atomic* 65, with one exception – this one has Core 2 Duo. That extra '2' means some serious grunt.

The Dreambook is a rebadged Clevo M570U, and is quite sturdy. As tends to be the trend these days, buttons and a display sit at the bottom front of the notebook, giving quick access to the time and media player functions.

Sound is unfortunately tinny, with Metallica's *Master of Puppets* becoming clipped and distorted at anything above 50 percent volume. The screen at its brightest is not wonderfully bright, leaving you tapping the button several times in disbelief – and the blown-out whites will have you reaching for the gamma in the video card control panel. A high gloss screen is present, but whether you prefer it or the matte is up to you. As seems to be common with laptops, light bleeds from the bottom of the screen, although this isn't too obnoxious.

In a rarity, there's an actual numpad here, not just function shifted letters – a huge plus in our book. Old school Eye of the Beholder players and accountants take note. In another rarity, but not a positive one, the touchpad sits

flush, meaning that if your palm accidentally drifts while typing the cursor will reposition, leaving you typing into a sentence three lines up. Fortunately this can be overcome by enabling the option to disable tap clicking while typing, but still, if the pad was recessed like every other laptop out there, this option wouldn't need to exist.

The extras are plentiful, with Bluetooth, Intel 54Mb/s 802.11g wireless, a Bison Webcam and interestingly, a Conexant Falcon II video capture card. TV tuners can be added if you wish.

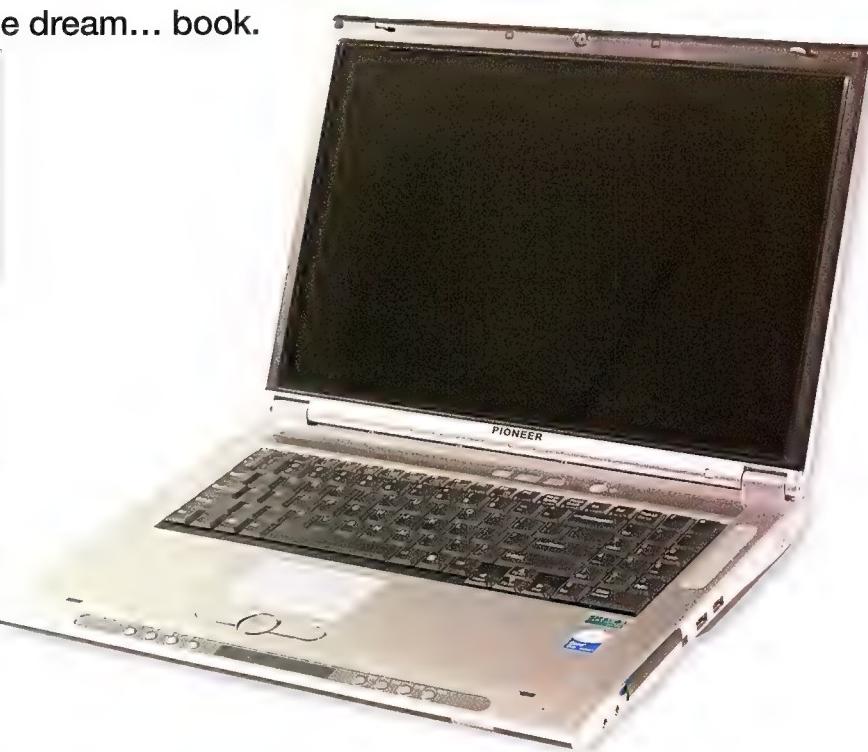
Pleasingly, as the M57U sits near the top of the food chain, there's a DVI port at the back. Two USB ports, one S-Video, one serial, one Gigabit Ethernet and one RJ12 jack sit at the back. Audio outputs and an aerial jack also reside here, while two more USB ports, Firewire, 7-in-1 card reader (MS/MS Pro/MS Duo/SD/Mini-SD/MMC/RSMMC), Express card slot and more audio jacks sit on the side.

The BIOS can be described in one word: disappointing. The lack of information and options given is disturbing and a little unsettling for those who like to have control over their PC. Performance, as to be expected, is where

this machine is at. Annoyingly, Windows didn't handle the power profiles properly for the M57U, and hence knocked the processor down to a 6x multiplier no matter what we did – half the speed. This is unfortunately a common issue among new laptops, the new hardware not interfacing with Windows power management properly. Another unfortunate fact is SpeedSwitchXP, the usual tool of choice, didn't work to overcome this. We ended up having to install CrystalCPUID, forcing the multiplier to 12x and dumping it in our startup menu. This is not ideal, and will hopefully be fixed by the time the notebook hits full production.

Now the throttle really opened up. We pitted the Dreambook against 3DMark06, SuperPi Mod, HDTach and Half-Life 2, and compared it to the previously reviewed Dell M1710. This is obviously not a direct comparison – the Dell was a Core Duo, not a Core 2, and had GeForce 7900GS video instead of GTX. Nonetheless it gives you an idea of the performance increase between the two technologies, and it's amazing to see this level of power in a notebook.

The Dreambook Power M57U is an excellent performer for a great price, so long as you don't mind cutting corners a little on build quality.



# ASUS P5W DH Deluxe

Craig Simms gets his Conroe on.

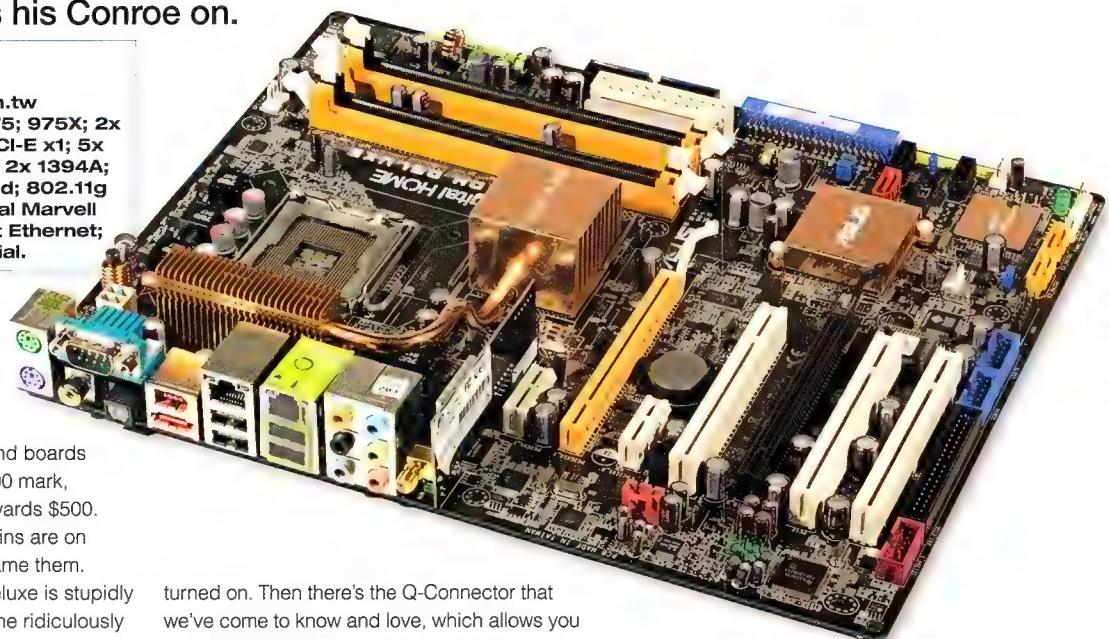
## SPECIFICATION

**Price** \$449  
**Supplier** ASUS  
**Website** [www.asus.com.tw](http://www.asus.com.tw)  
**Specifications** Socket 775; 975X; 2x PCI-E x16; 3x PCI; 2x PCI-E x1; 5x SATA; 2x IDE; 1x floppy; 2x 1394A; ALC882M Realtek sound; 802.11g 54Mb/s (RTL8187L); dual Marvell Yukon 88E8053 Gigabit Ethernet; optical/coax SPDIF; serial.

It seems that now Intel and AMD are cut-pricing their processors, motherboard manufacturers have stepped in to keep the total cost of ownership the same, with high end boards now comfortably topping the \$400 mark, and creeping ever so quickly towards \$500. Considering how razor-thin margins are on motherboards, we can hardly blame them.

In its defence, the P5W DH Deluxe is stupidly feature laden, as evidenced by the ridiculously huge manual included with this board.

Fortunately, most things included are actually useful, which is more than we can say for things like presets on monitors.



turned on. Then there's the Q-Connector that we've come to know and love, which allows you to hook the wire headers from your case into it, and then plug it onto your motherboard all in one go, rather than spending hours trying to fit every single fiddly pin onto the board while doing your best impression of a Cirque Du Soleil gymnast contorting yourself around the case.

Finally, there's a small and simple remote – with profiles for the most popular players already bundled, and five user slots so you can assign whatever hotkey you like to the buttons. In a glaring oversight, the Windows key has been omitted as a Shift operator, leaving only Ctrl, Alt and Shift. Further to this, the remote didn't work right off the bat. While you're asked to plug the receiver into one of the two USB ports under the second LAN port, all it would do is detect the hardware then tell us that the device was disconnected. After some random shuffling around we found that removing our mouse (which was under the first RJ45 connector), then plugging the receiver into that port, then back into the port it was meant to be in got things working. Hurrah for voodoo mechanics.

From the outset this is simply an 975X board updated to be able to take Core 2 Duo, and it still comes bundled with the ICH7 southbridge. It also supports 800MHz RAM and comfortably travels along at 1066MHz FSB, meaning we could open up some X6800 loving.

While it doesn't benefit from the 965's new memory controller, it does have one large thing in its advantage – CrossFire support. Speculation runs rampant over whether or not NVIDIA and Intel will see eye to eye long enough to enable SLI on the 965. But right now for a dual card solution and Conroe, it's either 975X or an updated nForce 4 board for SLI – the 590 SLI and RD600 are still nowhere to be seen.

As with all the top end boards these days the motherboard is heatpiped, so it runs cool and quiet. ASUS's continued wide spacing between the PCI-E x16 slots means you can still have two PCI cards in the system if necessary – oddly though, the PCI-E x16 retention clip has been altered so it can only be released from the heatsink side of a video card – tres annoying. The secondary IDE controller is also annoyingly placed at the bottom of the board, while the floppy takes precedence on the side.

We tested with a 7900GT, two sticks of Corsair 6400MHz in dual channel and an X6800, and compared it to AMD's highest offering, the FX-62, using identical components where possible. As expected Core 2 Duo performs well on the 975X, outstripping the FX-62, although AM2's memory bandwidth is still significantly higher.

If your pockets are lined with gold, or you absolutely must have the best of the best, the P5W DH Deluxe should cover all your needs, and then some.

This board, for example, comes with built-in 802.11g Wi-Fi from the get go. It also comes with a PCI bracket into which an MP3 player can be plugged, and it can happily play music through your speakers without the PC needing to be

	FX-62 & Gigabyte GA-M59SLI-S5	Core 2 Duo X6800 & ASUS P5W DH Deluxe
Sandra Processor Arithmetic Dhrystone (MIPS)	20,409	26,846
Sandra Processor Arithmetic Whetstone (FLOPS)	17,268	18,649
Sandra Memory Bandwidth Integer (MB/s)	8662	5518
Sandra Memory Bandwidth Floating Point (MB/s)	8670	5517
3DMark05	50,666	5281



# Hotway LanDrive HD9-U2LA

Price \$129

Supplier PC Case Gear

Website [www.pccasegear.com](http://www.pccasegear.com)

Specifications Aluminium 3.5"

external hard drive enclosure;

USB/Ethernet connection;

SMB and FTP server

**T**he LanDrive is essentially an external HDD enclosure constructed mainly of solid, brushed aluminium with extra plastic bits.

The installation of a 3.5" IDE hard drive is straightforward; just remove two Phillips head screws and four thumbscrews to gain access to the drive rack, plug in the internal IDE and power cables and then secure the drive in place. The only file table choice is FAT32, so file sizes exceeding 4GB are a limitation, however it does support 48-bit LBA to a theoretical maximum of 2TB.

The unit is powered by an external switching supply, but at least it is on the end of an extension lead, not an irritating brick. Once operational, the drive is plugged into a network point, and then accessed by a Web-based control panel to set up the parameters and permissions. The first step is to make sure that the drive is configured to your LAN workgroup – missing that little detail cost us about 10 minutes of pure frustration! The LanDrive can

also be set-up as a DHCP server, but if it detects an existing DHCP server on the network it will automatically disable this function. As an SMB (Samba) server you can share files and folders, with the ability to set share permissions, and the FTP feature has similar flexibilities. A final nicely is the power management feature, allowing the drive to spin-down after an inactive period of your choice.

Some things just make you exclaim, 'Oh, yeah!', and if you get excited about home network NAS capability (as we do) then this product will certainly fire your engines.  RP



**SCORE**  **8.0** OUT OF 10

# Corsair Twin2X 2048 6400 Pro

Price \$460

Supplier Altech

Website [www.altech.com.au](http://www.altech.com.au)

Specifications DDR2; 800MHz;

2x 1024MB modules; 5-5-5-18  
by SPD; 4-4-4-12 by EPP.

**T**he Corsair Twin2X 6400 is the first stab at low latency, high frequency RAM, happily sitting at 800MHz and able to reach 4-4-4-12 through EPP.

It must be said at this point that there are lower latency DDR2 800 and 1066 RAM sticks starting to hit the streets, but they are as rare as Bill's good teeth. Things should have improved by the time you read this, and it won't be long before we no longer have to trade off between latencies and clock speeds – however indications are our wallets will hurt from it. We hope to get our hot little hands on the new wonder kids from Mushkin, Geil, OCZ and of course Corsair soon.

Throwing the pair into our ASUS M2N32 SLI Deluxe with an FX-62, it pulled 8936MB/s int and 8921MB/s float in SiSoft Sandra 2007. It seems NVIDIA has taken the fun out of overclocking too, as we were unable to push the timings any higher than those it had already specified, despite pumping more juice in. Mark up one for EPP.



Ramping up the CPU as high as it would go, without losing stability, by setting the HTT up to 215MHz, and hence the RAM to 860MHz, we came to 9401MB/s int and 9338MB/s float in Sandra.

Trying to get a higher clock by lowering the multiplier and raising the HTT even more resulted in instability according to Stress Prime 2004, so we dialled back the RAM timings to the SPD default of 5-5-5-18, and consequently hit 1155MHz thanks to an HTT of 231MHz. Unfortunately this couldn't overcome the latency increase, and we lost around 400MHz of

bandwidth according to Sandra.

The TwinX 6400 represents the tip of the iceberg in terms of what we'll see in the future, but if you must go AM2 or Core 2 now, then it stands as your best bet.



**SCORE**  **8.0** OUT OF 10

## SPEC'S

Price \$329

Supplier Powerhouse PC World

Website powerhousepc.com.au

Specifications 700W; modular;

120mm main fan; 50mm secondary fan; up to 85% efficiency; 10 molex; 8 SATA; 4 PCI-E

We've been mildly impressed with Seasonic PSUs, mostly because of their utter, total and complete silence. So imagine our delight when we discovered that not only was there one with more power, but it was modular too!

The M12 (that's M for modular, kiddies) weighs in at 700W, and unlike the original S12 features a secondary fan, 50mm in width, near the modular outputs. Seasonic, always aware of volume, has ensured that it only spins up when needed, and in fact it stayed motionless during our tests.

The modular system is pretty much standard fare, missing the flashiness of Hiper's solution (*Atomic* 67, page 41), but still providing plenty of outputs with cables at a decent length. Interestingly two lots of dual PCI-E power connectors were included – foreseeing the possible need for four graphics cards.

Odd though is the fact that both the four pin and eight pin 12V connectors are bundled

along with the mandatory 24 pin connector

– leaving at least one of them in excess at all times. With the modular philosophy being to reduce cabling, it's a silly oversight.

Fortunately Seasonic's quiet reputation is still intact, although the noise generated is a little louder and whinier than the S12 600W. Despite this, the noise will disappear entirely within a case.

Plugging it up to our standard AMD test bench, at idle it pulled 3.42, 5.04 and 12.13 on the 3.3V, 5V and 12V rails respectively, and only dropped 0.01 on all three results when under load.

Seasonic has once again released a stellar product, which in more ways than one is akin to a super car – it's a steep price to pay, we doubt you need that much power, but



couched in the price is the comfort of knowing that you own one of the most prestigious and solid products on the market.



**8.5**  
OUT OF 10

## Antazone AS-C1000

## SPEC'S

Price \$75

Supplier Powerhouse PC World

Website powerhousepc.com.au

Specifications Socket 775/478/K8/K7; 2200RPM; 49.8CFM.

Antazone is a company never seen before in the pages of *Atomic*. However, it already follows the fine tradition of Taiwanese to English translation botch-ups when it comes to slogans. 'Innovation your life' it tells us. 'We know what you want! Make your Computer become Unique! The best partner of your Cool stuffs!'

Well, good we got that sorted then.

If you've seen the press image floating around that makes out the AS-C1000 to be completely gold, let us tell you it's not – the core is copper, with a hollow centre and radial fins joined from the inner circle to the outer. This is surrounded by a decidedly un-gold smoked plastic shroud. An 85mm Tek Chain A129525ML-F fan is attached to the front, also made of the aforementioned smoked plastic.

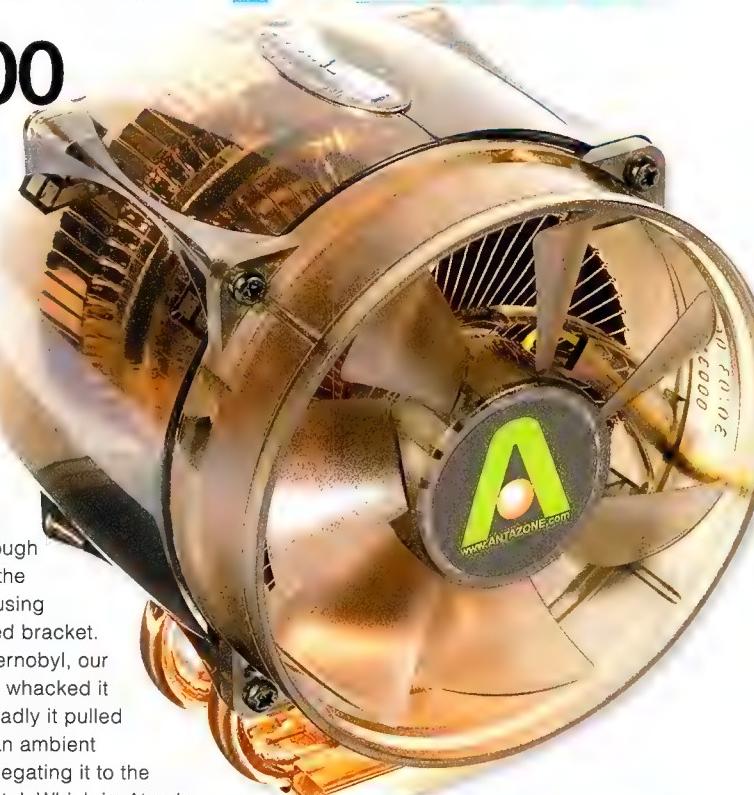
The 2200RPM fan blows inwards against the core, creating a wind tunnel that's pushed through and out the other side. It's by no means silent, yet it doesn't cross the

threshold of annoyance either. Two heatpipes connect to the die slug on one side, one to the other, with all of them rapping around the circumference of the sink.

Regardless of socket, to mount it you'll need to remove the existing backplate and/or bracket from your motherboard, then attach Antazone's cross shaped one, thread through some bolts and secure the heatsink down to them using yet another cross shaped bracket.

Thumping it on to Chernobyl, our calefacient calamity, we whacked it up to the default 80W. Sadly it pulled an uninspiring 54°C in an ambient temperature of 27°C, relegating it to the world of merely 'adequate'. Which in *Atomic* speak means 'bad'.

We think Antazone could probably do with a little more practice, learning what we want before it becomes the best partner of our cool stuffs.



**7.0**  
OUT OF 10



# S12 ENERGY +

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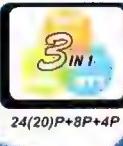
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# Corsair Nautilus 500

Price \$300

Supplier Altech

Website [www.altech.com.au](http://www.altech.com.au)

Specifications External box; Socket 478/775/754/939/940/AM2; copper CPU Block; four feet of tubing; 1800RPM high, 1300RPM low.

One of the rules of surviving in business is to diversify, and once again Corsair is straying away from its core business of RAM to bring us the Nautilus 500 – watercooling for your CPU.

The Nautilus is an external box, intended to sit on top of your case. Installation has to be the one of the easiest we've clapped our mitts on, with hoses pre-attached to the water block and attachment to the reservoir a simple clip and clasp affair. Filling the reservoir also rates among one of the most mess-free experiences we've had.

Because the Nautilus is an external unit, a passthrough PCI bracket is included through which the water tubes travel. A molex connector and two fan headers need to be hooked up to the PSU/motherboard for unit power and to measure fan and pump speed respectively.

The pump is unfortunately a little noisy – while switching the fan down to the lower setting helps reduce some of the overall ruckus,



it still hums along a bit like a fish tank filter. Ultimately you could get used to it, but there are quieter solutions on the market.

After the required flooding of the tank with additive and water, and making sure all air bubbles were removed from the system it was strapped onto Chernobyl at the standard 80W. The result was slightly underwhelming, especially considering the air cooled Zalman we reviewed this month: 42°C at high fan speed, and up to 44°C at low in an ambient temperature of 23°C.

With the noise generated, the cost and the

results recorded, we can see no reason why you would purchase this over a decent air cooled heatsink.

CS

**SCORE** **7.0** OUT OF 10

# Zalman CNPS9500 AM2

Price \$95

Supplier Altech

Website [www.altech.com.au](http://www.altech.com.au)

Specifications Socket AM2/754/939/940; 92mm fan; 1350RPM low, 2600RPM high; 530g.

Zalman's newest AMD cooler was launched alongside NVIDIA's nForce 5 range, and has been slapped with a great honking 'Recommended by NVIDIA' logo. It's gone so far as to light the fan with a green LED in case you weren't sure.

A sticker on the fan proudly proclaims it's 'Optimised for NVIDIA nForce', but unless we're missing something this could be what we call in marketing speak 'a lie'.

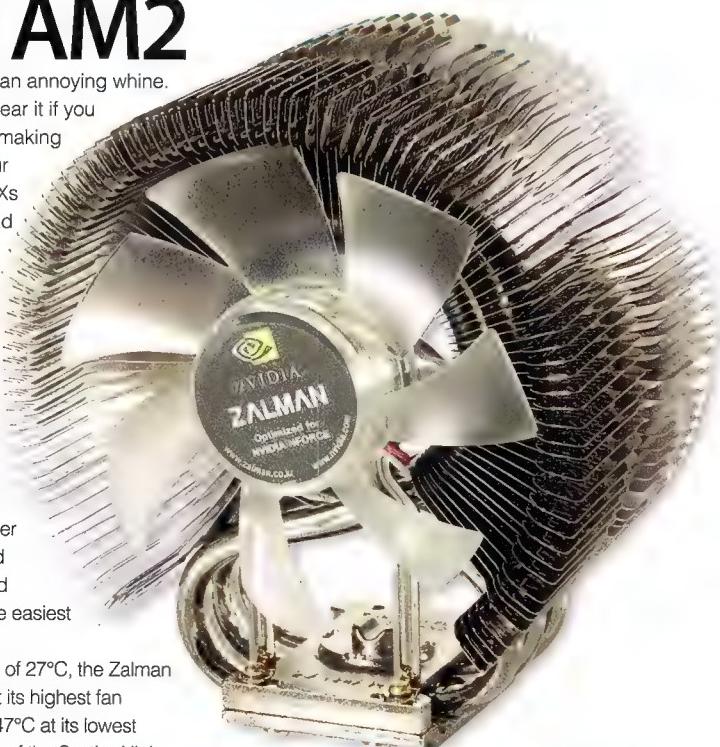
Fortunately, NVIDIA did pick a great partner, as the 9500 is a great heatsink. Two sets of three heatpipes curve up from the base and wrap around each other in a squashed figure-eight shape, fins radiating from the centre. A single 92mm transparent fan sits in the middle, its

of a whooshing sound than an annoying whine. At its lowest, you can only hear it if you put your ear right next to it, making it an excellent partner for our Seasonic PSU and 7900GTXs – stand two metres away and you wouldn't even know the system was on.

The retention clip seems a little odd at first, having to be first threaded through the heatsink, then anchored on one side to the socket positioned on a notch on the base of the heatsink. Then another clip needs to be added to the other side to connect to the second socket notch. Despite the odd design, it stands as one of the easiest clips we've used.

In an ambient temperature of 27°C, the Zalman returned an attractive 45°C at its highest fan speed, and a slightly higher 47°C at its lowest – putting it nearly in the range of the Scythe Ninja, a considerably larger heatsink.

If you don't like the idea of hanging one of the monster tower coolers off your motherboard, the CPNS9500 AM2 will give you close to the same performance with a lot less weight.



**SCORE** **9.0** OUT OF 10



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GRAPHICS BY



# ATOMIC

Our choice for  
the best gear the  
land has to offer

**T**here's nothing sexier than new kit. And whether you need to horde your pennies (Budget), want the most power for your dollar (Performance) or own a small mansion and

a collection of sports cars (Extreme), we're here to help with this handy matrix of *Atomic* recommended products. You may find your needs fall between categories – that's okay,

just mix and match to suit your budget! Each piece of kit has been reviewed hands-on in *Atomic*, so if you want to learn more, look up the issue and page number listed.

## CPUs



### Intel Core 2 Duo

PRICE \$330-\$870

Stretch a little further and buy yourself a Core 2 Duo – you'll be thanking yourself later. The E6300 is the cheap ticket to speed, at \$330.

**BUDGET**

I can't afford to eat... gimme gear!

**AMD**



### AMD Athlon 64 AM2 X2

PRICE \$220-\$510

Cheap CPUs are a wonderful thing, and the X2s are now wonderfully cheap. The 3600+ is your budget baby at about \$230.

## PERFORMANCE

Hardware that bangs the best for buck.

**intel**



### Intel Core 2 Duo

PRICE \$330-\$870

Core 2 Duo – crazily fast, crazily cool, crazily affordable, overclockable like buggery. The E6400 is the best buy, at about \$400.

**AMD**



### AMD Athlon 64 AM2 X2

PRICE \$220-\$510

The X2 series are still fantastic chips, and in the face of the Intel threat are now going for cheap. The 4600+ is your current sweet spot at about \$400.

## EXTREME

Gimme power. Money is no object.

**intel**



### Intel Core 2 Duo X6800

PRICE \$1700

Core 2 Duo came and rocked our socks off like Chuck Berry doing the laundry. Yeah, it's that cool.

**AMD**

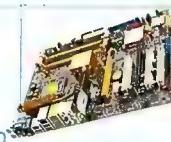


### AMD Athlon 64 FX-62

PRICE \$1600

Sadly gets beaten by a mid range Core 2 Duo, but still the top of AMD's pile.

## Motherboard



### ASUS P5W DH Deluxe

PRICE \$449

This definitely shouldn't be here, but it's all we've seen! Stay tuned next month for a more affordable option.

Reviewed in Issue 69 – Page 50



### MSI K9N Neo

PRICE \$149

Excellent performance from a budget board, with plenty of legacy slots for upgraders. Don't expect to overclock though.

Reviewed in Issue 68 – Page 33

## Memory



### Corsair Twin2X 1024MB 6400 Pro

PRICE \$215

Corsair has a history of providing nice, stable and fiesty sticks of random access memory joy. These RAM sticks are EPP compliant, have low latency and are nicely overclockable. 800MHz of fun for everyone!

Reviewed in Issue 69 – Page 51

## Video card

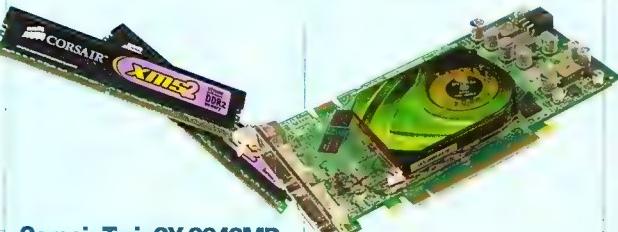


### Sapphire X1800GTO

PRICE \$380

The crazy amount of punch delivered by this card is worth stretching your budget a little. Viva la RADEON!

Reviewed in Issue 66 – Page 33



### Corsair Twin2X 2048MB 6400 Pro

PRICE \$460

Yes, these are the same sticks recommended for the Budget system. Sadly, they are also the only RAM sticks we've tested that are compatible with AM2 and Conroe. So until we get more in, the Corsairs will stay.

Reviewed in Issue 69 – Page 51

### NVIDIA GeForce 7900GT

PRICE \$400

In the face of stiff competition from the much cheaper X1800GTO, the 7900 wins out purely because of the strength of the SLI platform.

Reviewed in Issue 64 – Page 40



### Corsair Twin2X 2048MB 6400 Pro

PRICE \$460

Same story as the Budget and Performance systems. We just recommend more of it. Don't worry, we'll be opening up the selection in upcoming issues. Watch this space, or the one next to it.

Reviewed in Issue 62 – Page 37



### X1900XT Crossfire

PRICE \$500x2

If you can find a Crossfire Edition card, pair it up with a standard XT for maximum speed.

Reviewed in Issue 62 – Page 37

### GeForce 7900GTX

PRICE \$700x2

Until NVIDIA greatly improves the drivers for 7900GX2 SLI, the good ol' 7900GTX still rips.

Reviewed in Issue 64 – Page 40

## Coolers

## System drive

## Display

## Speakers

## Cases

**Arctic Cooling Freezer 64 Pro**

PRICE \$39

Super cheap, quiet and reasonable performance. Who could ask for more?

Reviewed in Issue 66 – Page 46

**Zalman CNPS9500 AM2**

PRICE \$95

Until we see some cheap AM2 compatible coolers, this one stays right here.

Reviewed in Issue 69 – Page 54

**Samsung HD160JJ 160GB**

PRICE \$115

Super quiet and yet still fast, the 160GB Samsung offers excellent value for money.

Reviewed in Issue 69 – Page 40

**Samsung 930BF**

PRICE \$650

Clocking in at 4ms, this gorgeous 19in screen has a colour depth and tonal range that will make you weep with joy.

Reviewed in Issue 61 – Page 46

**KOSS SB40**

PRICE \$110

You'll find that these circumaural boomers will do you justice just fine if you can't afford a THX 7.1 platinum plated surround sound setup.

Reviewed in Issue 38 – Page 30

**Cooler Master Ammo 533**

PRICE \$115

Perfect for LANs with its heavy duty handle, military styling and rugged construction, the Ammo blasts the budget competition away.

Reviewed in Issue 60 – Page 50

**Thermalright HR-01**

PRICE \$85

Tower cooling that will keep your tower cool. Whack a Nexus 120mm fan on for near silent cooling.

Reviewed in Issue 64 – Page 46

**Seagate Barracuda 7200.10 320GB**

PRICE \$180

Seagate's fancy new technology makes this beast both fat and fast. We're almost at 1TB!

Reviewed in Issue 69 – Page 40

**Samsung 244T**

PRICE \$1600

Brilliance at 24", the 244T offers 6ms gaming, a wonderful gamut and more inputs than an alien hooker.

Reviewed in Issue 69 – Page 48

**AVLabs AVL325**

PRICE \$210

While it can't hold a candle to the Z-5500D, with a price this low there's no excuse not to jump to 5.1.

Reviewed in Issue 64 – Page 50

**Cooler Master Stacker 830**

PRICE \$335

Like the Stacker before it, this sensational Stacker stacks sumptuous specifications salaciously.

Reviewed in Issue 61 – Page 36

**Asetek Vapochill Lightspeed**

PRICE \$1160

Vapour phase change. Ooooh. Vapour. Phase. Change. No matter how many times you say it, it's still cool (punt!).

Reviewed in Issue 64 – Page 38

**Western Digital Raptor WD1500ADFD**

PRICE \$460x2

Dear lord. The performance king hath cometh, short of whacking in a SCSI. Buy two and RAID 'em.

Reviewed in Issue 62 – Page 40

**Dell 3007 WFP**

PRICE \$2899

Thirty inches, 2560x1600, 11ms G2G. If you can handle the size and cost to run this massive beauty, you won't be disappointed.

Reviewed in Issue 61 – Page 49

**Logitech Z-5500D**

PRICE \$600

Able to play the 'liquid gold' that is DTS 96KHz/24-bit, this 5.1 beast can wreck both home and hearing alike with equal impunity.

Reviewed in Issue 48 – Page 56

**Lian-Li PC-S80**

PRICE \$499

The PC-S80 must have been designed by an earmuff wearing design dude as it not only looks sleek and cools well, but it's super quiet to boot.

Reviewed in Issue 66 – Page 41

## GROUND ZERO

Dan talks tech  
like you've never  
heard before.

Another display model... don't  
expect to be able to pluck this off  
the shop shelf any time soon.



# Fuel cells... are we there yet?

**Daniel Rutter** wants more cells to fuel his power.

It's been the thick end of four years since I last wrote about fuel cell power. Surely, now, there are some consumer fuel cells you can actually buy.

Well, no. Not really. But that doesn't mean there's no news. Heavens, no. There's *news* all the time.

Another laptop with a fuel cell on the back of it, shown at a computer expo but not on sale! News written by people who can't tell the difference between zinc-air batteries and fuel cells! Yet more confusion about some gadget that appears to run on water, with the proud assistance of the usual crowd of loonies and scam artists who insist that they know how to run a car on it!

And, of course, the bane of the gadget blog reader's life: design projects that look cooler than hell, but only actually exist as a non-working model and will never actually be made.

I was, however, excited when I discovered the Voller ([www.voller-energy.com](http://www.voller-energy.com)) fuel cell Automatic Battery Charger, or ABC. It looks like a better-thought-out product than most others I've seen. It even comes in 110V and 220V versions, both of which also have a cigarette-lighter and USB-power outlet. Great! Let's buy one!

Needless to say, you can't.

Voller has a long list of 'agents' on its site, most of which do not in fact appear to sell any Voller products. The couple that do have a Voller device or two for sale don't have the ABC. So it's business as usual in the fuel cell ghost town.

I'm willing to believe that Voller can make plenty of ABCs if it wants to, but nobody sells them, because nobody wants them. A little digging into the specs and, ahem, price tags reveal why.

If the ABC costs about the same as the nearest Voller product to it that I found on sale, then it costs about \$9500, plus quite a bit extra for hydrogen fuel canisters.

The 'CP grade 99.99 percent pure hydrogen' you need to run the ABC or any other fuel cell device is available from scientific gas

suppliers; it shouldn't cost much more than \$130 to fill even a K-sized cylinder (the big ones, that weigh 61 kilos empty). But your local welding supply place only has 99.5 percent pure hydrogen, if they have any at all.

The ABC has 200W peak output or 70W continuous (only 65W through the AC socket). Running it at 50W sucks up 1.4 sea-level litres of hydrogen per minute. A full K cylinder can hold 7419 litres of H<sub>2</sub>, giving you 3.7 days of 50W operation, and a total of 4416 watt-hours.

Which sounds like a lot, until you realise that you can get more power than that from three litres of petrol in a little pull-start Honda generator.

Modern small petrol and diesel generators are surprisingly quiet and clean, quite cheap to buy and very cheap to run. But you still of course are probably not *itching* to run one indoors, and they're lousy if you only need to run a small load.

But fuel cells have further limitations of their own. The ABC, for instance, has an operating temperature range from 5°C to 40°C. If the fuel cell freezes it'll be ruined, so you're expected to leave the ABC in standby mode; if the temperature falls below 2°C, it'll turn itself on just to keep warm.

Fuel cells are popular in aerospace applications, and that's where, I'm afraid, it looks as if they're darn well staying for the time being.

Perhaps us nerds are just spoiled. We're used to everything being twice as fast and half the price every two weeks. Consumer

fuel cells seem to be developing at the speed of a *normal* technology. I suppose that's OK, just this once. But could you cool it with the meaningless product announcements, guys?

Dan will continue his search for alternative ways to power his hair straighteners.

[dan@atomicmpc.com.au](mailto:dan@atomicmpc.com.au)

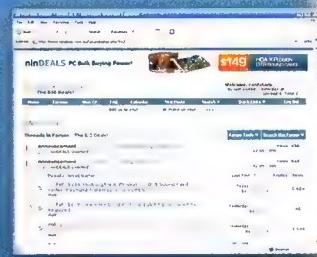


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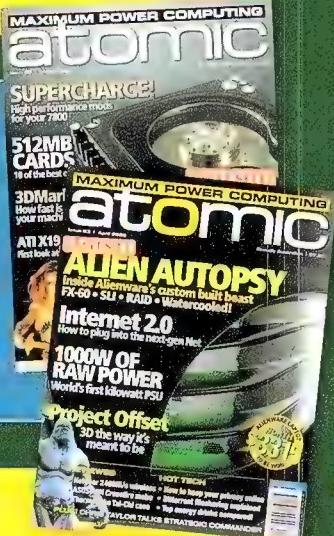
There's nothing like an *Atomic* T-shirt to keep you warm at night, except maybe a giant heater. You can wrap it around your body like some sort of black-and-green but really tiny blanket, and rest soundly as it traps your body heat. Alternatively, you can walk around outside with it on and impress women, men and dinosaurs with its magnificence.

Wouldn't it be great if we gave away 20 of these lovely shirts to current *Atomic* subscribers, just for being, well, subscribers? Then start dancing in the streets because that's exactly what we're doing. So, if you already get *Atomic* by the magic of mail, sit back and relax, because you're already in the draw!



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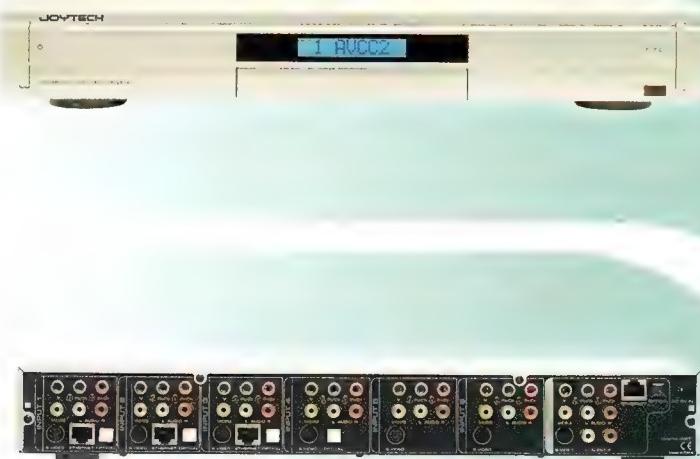
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# GAMEPLAY

GAMES, GAMING AND GAMERS  
COVERED ATOMIC-STYLE

Atomic has covered gaming for a very long time. Believe it or not that long time is actually calculable: If you put finger to abacus you'll come up with the magic figure of '6'. Well almost six. Anyway, add 'years' to this almost-number, and you'll have a good idea of how long we've been doing games. And we do all sorts of games – PC, console and handheld. But mostly PC.

Like any magazine, or anything at all that exists in fact, we're constantly looking at ways to improve. When we had a look at the way we did game reviews, we decided that we needed to do more. To put something a little special in our games section.

We're not going to blow smoke at – or into – you: anyone with a PC and a spare hand or two can do a game review. But now, Atomic is different. A better sort of different.

Part of that different could involve showing screenshots of a game at minimum and maximum detail, to give you an idea of what it will look like on a low and high end machine, respectively. Another bit of this different could be a write-

up on other games in the same genre, a history of those games, or even a developer interview. A final part of that different-ness could be a tweak guide on how to get the best performance from a game, be it by moving sliders in the Graphics menu or digging into a config file and coming up with crazy values to set your resolution to.

Whatever it is, it'll be exciting. And new. And something you won't be able to get from any other game review in any other magazine. That's because Atomic does things better. A lot better.

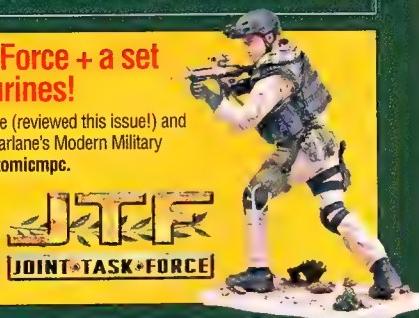
Now with this all in mind, we can take a look at this month's Gameplay. There's an Engine Room on HAZE from the great fellows at Free Radical; reviews of *Brick*, *Thank You For Smoking* and a rather thick book called *Beginning GIMP*. We also managed to snag the Australia exclusive for Joint Task Force, and Ben has gone to the trouble of breaking down Atari's GTR 2 so you can get the most from this brilliant racing sim.

With all this awaiting you, one has to ask why you're still reading this! Go, read!

## Win one of five copies of Joint Task Force + a set of McFarlane's Modern Military figurines!

Five lucky people could bag themselves a copy of Joint Task Force (reviewed this issue!) and one of those winners will get a set of six-inch figurines from McFarlane's Modern Military collection. All have to do is answer the question below at [www.atomicmpe.com.au/complist.asp](http://www.atomicmpe.com.au/complist.asp) to be in the draw. Thanks to Vivendi ([www.vivendi.com.au](http://www.vivendi.com.au)) for these most excellent prizes!

**Q: What is the name of the developer behind Joint Task Force?**



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**Engine Room**

Logan Booker goes behind the scenes of HAZE, Free Radical's next-generation FPS.



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What does Samuel L. Jackson know about snakes? Find out here.



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**Joint Task Force**



**Sword of the Stars**

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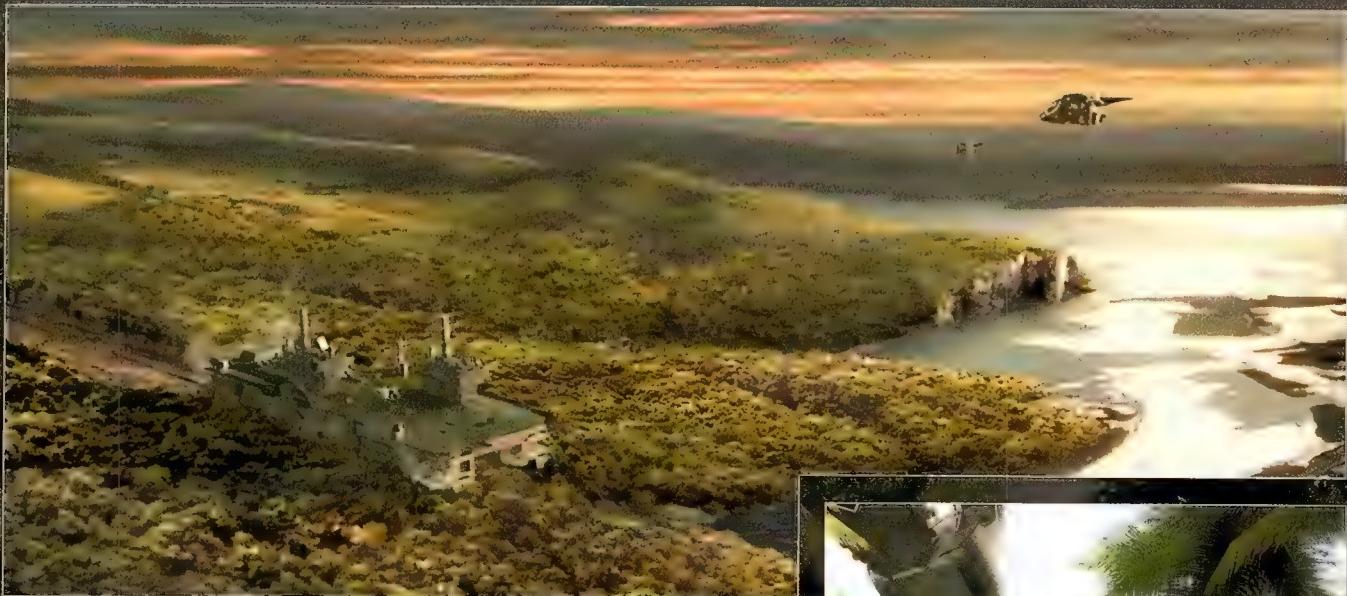
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# Totally Radical

**Logan Booker** combat drops in on Derek Littlewood, Mike Armstrong and Rob Yescombe to get the dirty on HAZE.

**W**hat exactly are we expecting from next-generation gaming? Do we even know what next-generation is? Perhaps it's up to the game developers and hardware manufacturers and not us to define the term. If that is the case, then some would have you believe it's a graphics thing. Others, something to do with AI. Even more toss around words like 'cinematic' or 'orgasmic'. A few just toss.

If we're to believe the marketing, 'next-gen' has been and gone exactly eleventy billion times in the past 15 years. So are the new consoles, DirectX 10 and G80/R600, the real next-gen?

One place we can start searching for the answers, other than the sock drawer or that dishevelled shoebox under your dad's bed, are the games – the end product. The only reason why we shell out good coin for \$500 CPUs and \$1000 video cards. In our pursuit to nail this year's next-gen to the wall, strip it naked and interrogate its wobbly bits

on shaders and High Dynamic Range, we hit up the guys working on HAZE, an upcoming first person shooter from Free Radical. If anything is next-gen, it's an FPS with the PlayStation 3 as the lead platform, a written-from-scratch engine and under the care of ex-Rare developers.

## Foggy beginnings

As mentioned, Free Radical contains a number of former Rare employees, including Steve Ellis and Graeme Norgate. Before leaving Rare in 1999 and founding Free Radical shortly thereafter, Ellis and Norgate worked on titles like GoldenEye and Perfect Dark – as well as Free Radical's own TimeSplitters. An FPS pedigree like this is hard to top. Free Radical is confident that its expertise, and new technology, has what it takes to define next-gen in anyone's book.

'We want to redefine the intensity and variety of emotions a player can experience in a game. We want HAZE to become the definitive next-gen shooter and maintain Free Radical's reputation for developing some of the best games in the world,' explains HAZE's Creative Director Derek Littlewood.

'Right from the word go, our priority with HAZE has been to deliver what many games have promised, but failed to do – to create an emotionally intense experience without ever sacrificing the playability and quality of action that Free Radical is renowned for,' says Littlewood. 'To supplement this, in comparison to our previous games, HAZE is going to provide some real action depth.'

Free Radical's previous games, by Littlewood's own

Top 'Welcome to South America. Now get out and restore order!' Above right 'Redefining the intensity and variety of emotions of being blown up...' Below There's nothing like a taste of Nectar and some shootin' to get the blood pumping.



## Real-life Nectar

If there's anything we'll miss about the Electronic Entertainment Expo – or E3 – it's the neat things publishers and developers did to promote their games, beyond booth babes... or booth men. One such neat thing from this year's E3 came from Ubisoft and HAZE in the form of a compact black box.

Inscribed on the lid was the HAZE game logo and inside a mirror and about 40 or so tiny caffeinated mints. This 'real-life Nectar' was easily one of the best take-aways of the show, effectively counteracting the sore feet and jet lag.



admission, have been cartoon-like in look and feel. The developer feels that HAZE is its chance to move away from this easy-going content and forge something with depth in both plot and emotion.

Oh, and graphics that will melt your face.

'The realism of the environments in HAZE are really going to blow you away,' says Littlewood.

## Plot shots

Free Radical is promising a great story to couple with all the other, more visual, cool bits.

According to Screenwriter Rob Yescombe, the game is set in 2025, where NATO and the UN are non-existent. In a bid to get burgeoning debts under control, many countries let big-arse corporations handle their military needs. One such corporation is Mantel Global Industries, a company so broad in vested interests and large in size that it makes Microsoft look like a cardboard box factory.

[Mantel is] involved in providing the materials or designs for nearly every aspect of modern life. However, in this story, we focus on two of its primary businesses: its armed forces and biomedical support systems.

The protagonist of this semi-dystopian story is Jake Carpenter, a Sergeant in Mantel's army-for-hire. The game itself takes place over three days, with a backdrop of a South American country ravaged by war after a violent coup.



Mantel is called in to deal with the problem – to restore democracy to this war-torn land. To make things easier for their soldiers, Mantel's biomedical department has developed a "nutritional supplement" called "Nectar" that enables the troops to fight harder and smarter,' explains Yescombe. With all the best equipment, tactics and support, Mantel soldiers have it easy.'

HAZE differs from other shooters in that the situations and environments represent a possible future, if humanity continues in its ways. With corporations stepping in for governments and the concept of Nectar similar in ways to soma, Free Radical appears to have taken a page or two from Aldous Huxley's *Brave New World* to flesh out a realistic 2025.

I think HAZE has a pretty unique point of view on the presentation of war in games. I can't say too much about it at this stage but it asks questions that you won't have seen ►

Above 'Well he looked like he needed to be subdued.' Below 'Mantel soldiers have it easy with the best equipment' – you'll get more than this little shooter.



Bottom 'Gentlemen, we have a situation.' Mantel is ready to do the government's dirty work.





**Top right** 'The realism of the environments in HAZE are really going to blow you away.'

**Above** HAZE is more *Brave New World* than 1984 despite this scary screen.

in a game before – questions and issues that are worth debating even after you've finished it,' says Littlewood. 'The cool thing about it is that not only have the visuals evolved exponentially since our previous titles, but our storytelling has too, and that's something I don't think you're seeing in other next-gen titles at the moment... A number of games are already delivering next-generation visuals, but I think what will mark HAZE out is that it will deliver next-generation gameplay and narrative too,' Littlewood says.



TimeSplitters, another of Free Radical's titles, features co-op multiplayer.

## Op shop

HAZE is all about the team-based gameplay. Surely that must mean cooperative multiplayer as well? Creative Director Derek Littlewood was happy to oblige.

'We've got cooperative play through the main campaign. This has always been a feature we felt added real replay value to the TimeSplitters games so we were really keen to retain it in HAZE. Besides, any gamer and their friends interested in co-op will be in for a treat with HAZE – we probably won't limit ourselves to just

a plain two player co-op,' says Littlewood.

'We've also got a variety of objective-based multiplayer maps that will support a great numbers of players online. The really cool thing about these is that they aren't just standalone experiences. Each is objective based with its own miniature story that ties into the main narrative of the game.'

HAZE will also feature your standard deathmatch and team-based multiplayer, allowing players to fight as Mantel or rebel troops.

advanced ordnance, all of which will be available to you as you play through the game,' says Littlewood. 'We also have some very cool new gameplay features, the Nectar abilities in particular... We spent a lot of time analysing what it is you spend your time doing when playing a first person shooter, and we cherry-picked these abilities to enhance that experience.'

Following in the footsteps of Full Spectrum Warrior, and even Rainbow Six, Jake will be accompanied by a squad of three or so team mates. Under the hood of these guys, and your enemies, is Free Radical's 'Conspire' AI, which allows each character to move autonomously and interact realistically with their environment. They'll retreat, find better ground, identify choke-points and call for help if they get into trouble.

That doesn't stop you from yelling a few orders to your troops if you have something special in mind though.

'You'll be able to allocate orders to your team, either individually or as a group. A lot of squad controls are tricky or too complex to work on-the-fly, so we're keeping it brilliantly simple with our "Tap-Tap" system,' explains Littlewood. 'Just two taps of the D-pad, one to select who you're allocating the order to, and one to select the order itself.'

According to Littlewood, the order system is context-sensitive, so certain button combos will issue different orders, depending on the situation.

By the way, you can forget about level transitions. HAZE will be so seamless you'll think your hard drive has morphed into a bank of flash RAM. This, says Littlewood, was a core aim of the project, as having loading screens or progress bars jumping out at you would do an excellent job of shoving the player out of the experience, destroying immersion and blurring the focus on realism.

'We also wanted to give the player complete continuity in terms of location and timeline, so for instance, rather than simply jumping from one location to another, you'll catch a ride in a Mantel vehicle to get there instead. And similarly, you'll play through several days and nights as you progress through the game,' he explains.

## Get the tech

Despite rumours to the contrary (see boxout 'Is that CryEngine?'), all the technology in HAZE is studio-grown,

## Is that the CryEngine?

No, it's not. Yes, it has jungles and lighting, but that's where the two engines part ways. The technology running HAZE is built from the ground up by Free Radical, to take advantage of next-gen hardware. With the game finding its way onto the PS3, Xbox 360 and the PC, starting from scratch with neither the developer's own TimeSplitters engine nor a licensed one, was probably a good idea. Hence, a new engine and a new IP...



On the left is Crysis, the right HAZE. Although similar, both engines are being designed by different teams. Note the heavier use of HDR in HAZE.

giving Free Radical complete control over the game from the ground up. Considering the game will feature on the latest round of next-gen consoles and the PC, this is probably a wise move on its part. According to HAZE's technical director Mike Armstrong, the other primary reason was to take full advantage of High Dynamic Range lighting. Like Free Radical's previous technology, HAZE will make use of fullscreen filters to add special visual effects to the game.

As one of the few games we've heard of being developed with a PS3 lead and an in-house engine, Free Radical is

Below Rather than simply jumping from one location to another, you'll catch a ride in a Mantel vehicle to get there.



very aware of the ins and outs of development with the console. Armstrong however states that there are more ins than outs with the PS3.

'It's great! Working on the PS3 has allowed us to create vastly superior environments that verge on photorealism – fullscreen effects, High Dynamic Range (HDR) and obscenely complex shaders. As well as that, it has enabled us to implement some of the most advanced AI seen on any platform. Our "Conspire" AI system is really going to drop jaws on a worldwide scale,' explains Armstrong.

Speaking more generally, Armstrong says that creating visuals for HAZE across platforms has been remarkably easy. The tricky part is the complexity of the visuals, which include creating multiple textures, shaders and other tidbits.

The graphics engine itself is based on Shader Model 2.0, with support for 3.0. Although most of the shaders will



**Right Mantel equips its army with a wide range of technologically advanced weapons. Below How it all comes together, from wireframe to final render.**

be SM 2.0, Armstrong says that anything that can take advantage of SM 3.0 will benefit from optimised shaders and fewer rendering passes, boosting performance. A custom shader setup in the 3D rendering and modelling program Maya allows the developers to specify many, many shaders for use in the game, and include parallax mapping, refraction and water.

The same shader system combined with the HDR's accuracy, allows us to post-process the screen to support a whole bunch of filters, like depth of field, motion blur and bloom,' says Armstrong.

The PS3's Cell (as well as the two extra processors in the Xbox 360 and dual-core PCs) will get a good workout, as HAZE will fully harness multi-core/multiprocessor setups. Armstrong says that systems like physics and other engine tasks (such as AI) will be handled separately, if the hardware is available. Could HAZE be the first PC game to require a dual-core CPU? We'll have to wait and see. Talking of physics, HAZE will support AGEIA's PhysX processor for hardware-accelerated physics.

Perhaps the part of the engine to receive the most attention is the AI. Littlewood says that getting it just right was a game in itself.

'When HAZE isn't assaulting us with unexpected giant parrots or too-smart AI characters who can bounce grenades off five different walls to land directly at our feet, probably our biggest challenge has been to develop an AI system capable of communicating the intensity and range of emotions that HAZE requires. Fortunately we've some very talented AI coders and animators, who have really been able to bring those characters to life,' says Littlewood.

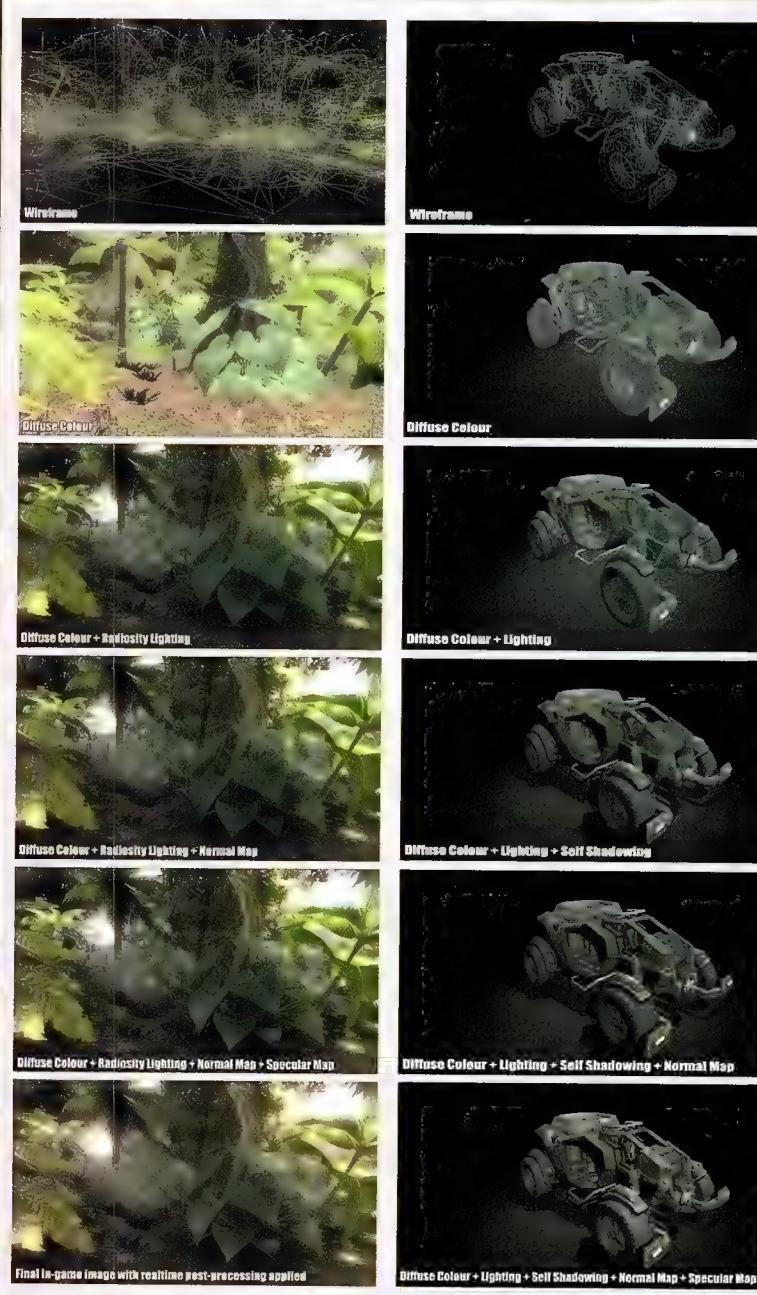
## Beyond 2025

According to Ubisoft, HAZE's publisher, the game is expected out in March 2007. It's a while to wait, but Free Radical is eager to do a good job of the game and live up to the developer's hard-earned reputation.

'At this stage we are fully focused on the single and multiplayer modes of the game with next-gen and 100 percent relevance in mind. We want to provide a full, diverse and intense single and multiplayer experience straight out of the box instead of shipping a half-finished game with a "mod" feature in order to let our community do all the polish,' says Littlewood.

'I think the game is very close to our original intention. So in terms of development, our ongoing task has simply been to find as many intelligent ways to facilitate that action-emotion experience as possible.'

'And certainly, Ubisoft's input has been invaluable thanks to its own experience in creating tactically rich, narrative-led experiences.'





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# A4Tech X-750F

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 2500DPI; 6.4MP image processor;  
 3xFire button; on-the-fly DPI button.



First pulled out of its box, we thought someone had switched our X-750F with a 1959 Cadillac. The black chassis, raised silver plastic and psychedelic flashing mousewheel made on-the-spot identification close to impossible. Closer examination revealed that we had indeed received the correct product, disappointing many geriatrics at Atomic HQ.

The X-750F is veteran peripheral maker A4Tech's attempt at a gaming mouse, using Agilent's ADNS-6010 laser. It's the same one in Logitech's G7, however A4Tech has managed to squeeze 2500DPI out of the sucker, over its rated 2000.

Despite comparisons to a certain mid-20th century automobile, the X750F looks far too cheap, thanks to the silver plastic, extremely thin USB cable and the '3xFire' orange button that rests to the left of the mousewheel. This button simulates three normal LMB clicks, supposedly providing an advantage in first

person shooters. In practice you'll more likely get banned from any online server you play on, but that's not a big problem when you consider it doesn't do much anyway. Firing up Half-Life 2, we were able to empty 18 rounds from the standard pistol in three seconds without the button, and 2.8 with. So unless that 0.2 of a second has been getting you killed lately, it's just a bright orange novelty.

The middle mouse button/wheel has to be one of the best we've ever seen on a mouse, firmly clicking into place as it rolls. Depression is fantastic, the wheel acting like a button, rather than wheel with a crappy trigger.

Just below the mousewheel is another button that shifts between six levels of DPI. The colour of the mousewheel changes as you move through each mode, with no colour signifying the lowest setting of 600DPI and flashing yellow/green for 2500DPI.

Oddly, the back/forward buttons are reversed by default, but this can be easily reconfigured. The back button is also a little 'soft' and doesn't click soundly like the rest of the mouse.

Included with the X-750F is A4Tech's 'X7-Jump' software that lets you configure the DPI of both the X and Y axes. There's also a macro recorder, so you can bind a set of key presses to one of four mouse buttons (back, forward, right and middle).

Overall it's a great mouse for the price, but lacks the manufacturing quality to make it stand out.

LB

**SCORE** 8.0 OUT OF 10

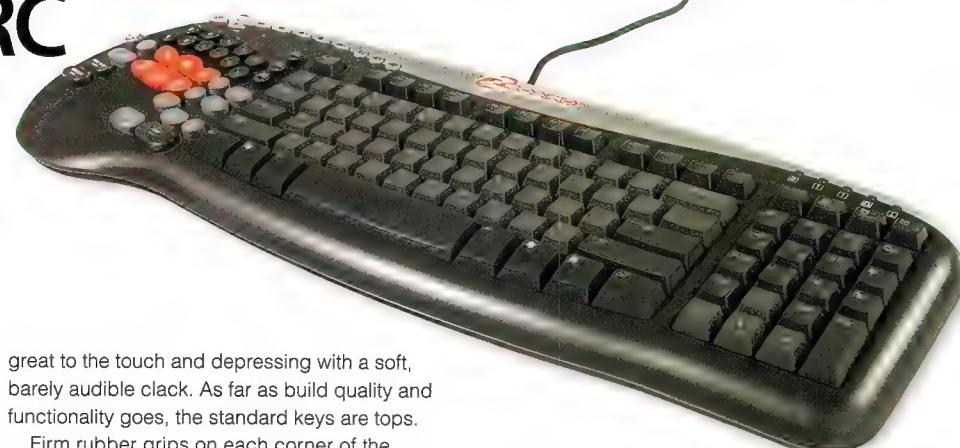
## Zboard MERC

**SPECS**  
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 Supplier Wavetech  
 Website [www.zboard.com](http://www.zboard.com)  
 Specifications Custom Zboard keypad; 34 gaming keys, 11 function keys, 97 normal keys; 53.5x20x2.7cm; ZEngine software.

Damn! This thing is long. If you happen to be using one of those cheap IKEA desks with the roll-out table for your keyboard, the Zboard MERC is going to gobble most of the real-estate, leaving your poor mouse with nowhere to go. If you can deal with this, please keep reading.

The reason for the extra length is to accommodate Zboard's custom keypad that provides a larger 'key' surface for important controls such as movement, and positioning others like duck and reload in more comfortable places (except for crouch, which seems harder to get to than the default Left Ctrl key). However, this comes at a cost – compression of your standard 101 keyboard to 97. And for normal typing, you're really going to miss those four keys not being in their usual positions. This is most noticeable when you go for Delete or Home so unless you have a notebook fetish, expect a significant adjustment period.

The keys themselves are very slick, feeling



great to the touch and depressing with a soft, barely audible clack. As far as build quality and functionality goes, the standard keys are tops.

Firm rubber grips on each corner of the board make sure it doesn't shift. It stuck like glue to our 'review' desk and simply would not budge at all with even the roughest of sideways shoves.

Without drivers, the board doesn't do that much. In fact, the additional Zboard keys do all sorts of random things by default, counter-intuitive to the alternate functions printed in small print on each key. Once ZEngine, the board's software, is installed it works exactly as advertised. Profiles are available for a range of games, including popular titles such as Battlefield 2 and Counter-Strike, as well as the more reclusive Dungeon Siege 2 and Thief: Deadly Shadows.

We loaded up the Half-Life 2 profile and

gave the Zboard a whirl in HL2: Lost Coast and it's competent enough. With the exception of crouch, we found our fingers fell comfortably on the Zboard's keypad, and it's nice having functions like quick load and save and print screen close at hand.

The price, size and difficulty to use as a normal typing keyboard hurts the Zboard MERC, but if you're mostly a gamer, feel free to add another half a point to the score.

LB

**SCORE** 7.5 OUT OF 10

**CREATIVE**

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## GTR 2

**Ben Mansill is looking at you when he says: 'If you only buy one racing game this year, buy GTR 2.'**

The new god-king of racing sims is here. This monster looks fast, drives fast – immensely fast – and is hard enough to make sim-heads feel elite, yet driveable enough to attract arcade racers ready to graduate.

There's a purity about this game, and it all stems from the legitimacy of the developers. You see, SimBin is a hardcore bunch of crazy Swedish race nuts, led by a proper GTR racer. The huge success of the original GTR has given the company the impetus and dollars to push on with a sequel. The new game seems identical to the original until you have a bit of a poke under the bonnet to see what's different.

The most noticeable change is the handling of the humungously over-powered European sports cars. They're... well... easier to drive. Now, that doesn't mean 'dumbed down'. And it certainly doesn't translate to 'GTR was so unbelievably hard to drive it scared off millions of dollars worth of potential customers, so we've tweaked it so even leadfoot gumbies can at least get a car around a track without coming off on every corner.' Only a cynic would say that.

What SimBin does say, is that the 'low-speed handling' has been 'improved'. You can feel it, too. SimBin also says that tyre characteristics have been fully reworked – something you can definitely feel. Carry too much speed into a corner and you can sense the tires scrub and

skate against their grain. It's a beautiful thing.

What hasn't changed is the devastatingly good physics you get. Never have cars felt so fast, so powerful, so imbued with mass and momentum. Driving them is as easy as pretending you're driving a real GTR car (if you find that hard to do, just close your eyes.. something we don't recommend when driving a really car, mind you). There's no rubbish with learning the 'driving model'. These cars handle like the real thing. So yes, you need to practise before you can put in a good lap.

The GTR series is built around ferocious race versions of mostly European super cars, though a few Japanese and US cars are thrown into the mix. Worth super-special mention is the sound, all sampled from the real cars. You'll just sit there grinning ear-to-ear even as you idle in the garage with a bubbling 700HP race V8. Floor it and you'll just sit there laughing to yourself.

Enemy AI is the best ever, and could teach Codemasters some manners. The AI cars are aggressive and fast, yet fallible and while occasionally bullying, never suicidal.

The whole package is superb. It is as much a joy to race the AI as it is to just sample the many cars and get good at each of them.

If you fancy yourself as any kind of racing sim fan, or car nut, you simply must get GTR 2. It's the wood in gaming's pants.

### VERDICT



Deeply satisfying to drive;  
the cars feel perfectly *right*,  
astonishing opponent AI.



We honestly can't fault it.

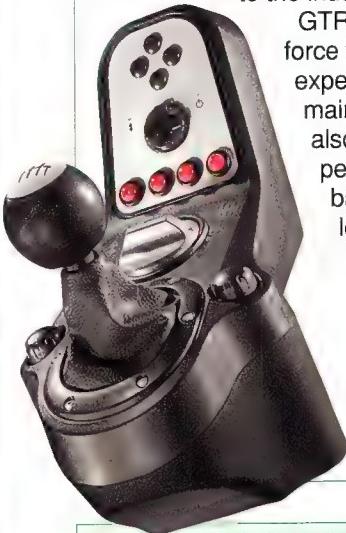


**8.5**  
OUT OF 10

## WHEELY GOOD

You need a wheel. Don't even think about playing with a keyboard. *Atomic* uses and recommends the Logitech MOMO Racing wheel, and is very much looking forward to the indescribably sexy Logitech G-25.

GTR 2 has the most comprehensive force feedback support we've ever experienced. Specific settings for the main wheel brands are built in. You can also adjust intensity and the overall percentage of force applied on slider bars. Mess around to get exactly the level of force you like best.



GTR 2

The Logitech G-25: Two FF motors in the wheel hub, a real actual clutch pedal down below and, jumpin' Jack Brabham, a flamin' separate gearbox and switch unit! Available later this year.

## NEW RENDERING CORE

Which is not to say an all-new engine. GTR 2 is properly DX 9 and features spectacular rainy road wetness and realtime ambient lighting. It has proper legacy support for DX 7 and 8 shaders too. Driving on a regular blue-sky, dry track, sunny day, the new game looks no better (or worse) than the old.

Framerates are lovely and smooth. We tested with an Athlon 64 3800+ and 7800 GTX box and with max AA (6x) and it stayed mostly above 40fps at 1600x1200 res. The track textures don't need forced anisotropic. Reducing the number of on-track cars will help if you need just a bit more grunt. We recommend running all driving games with max AA enabled, as the upcoming corners should be crisp and sharp for pixel-perfect racing lines.

GTR 2 also (beautifully pointlessly) supports swaying trees. If you can detect a gentle waft of leafage on a tree 100 metres away, as you rocket past at 250km/h, then get your damn eyes back on the road.



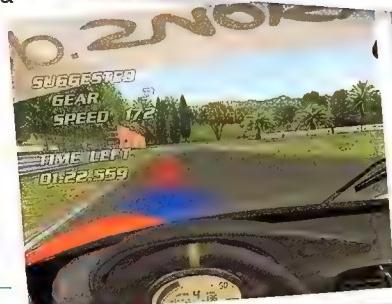
## DRIVING SCHOOL

GTR 2 is hard like Richard Burns Rally is hard – devilishly. So, like RBR, it has a driving school! It's fantastic! A series of tutorials will save any leadfoot from shame, and teach new refinement to the best of us.

Driving school cap: The blue zone is for getting the pedal to the metal, the white zone for coasting, and the red zone for dropping the anchors.

## GOT MODS?

The original GTR was open to a staggering array of car, track and other mods. GTR 2 will be the same, no doubt. Now, go and race around a far better Mount Panorama than anything Codemasters could ever dream of, in a V8 light-years better than anything ever officially released!





# Joint Task Force

**Logan Booker is a force to be reckoned with.**

There's a definite drought in the RTS market. Battle for Middle Earth made a few waves and Supreme Commander has generated a lot of hype, but there's only so much one can take of the fantasy side of RTS, and Gas Powered Games' spiritual successor to Total Annihilation is some six months away.

That's why we were excited to get Joint Task Force in. Now, it's not your typical strategy game. There's no base building or resource gathering. JTF is set in a modern setting with real vehicles and arms of the military. As such your primary resource is money, which you can use to drop in reinforcements in the same style as Ground Control.

In the single player campaign you 'play' Major O'Connell, an officer of the US Army. O'Connell is looking to redeem himself after inadvertently helping out what has since become the enemy and it's only thanks to his wealth of experience and knowledge that the Army has let him back into the fold.

O'Connell is a playable unit in most missions, and serves as your basic 'hero' character. He gains experience as enemies are killed and mission objectives completed, which can then be spent to give O'Connell new abilities, like a defensive aura or improved accuracy and damage. Normal troops under O'Connell's command can also gain experience and, when they get enough, become a hero unit themselves that can be carried from mission to mission. So

not only do you get the typical RPG element that many RTS games have adopted, developer Most Wanted went a bit further. Now you have a reason to properly protect your troops.

Units can also be equipped with extra bits of equipment, including gas masks, camouflage gear and special weapons like LAWs and grenade launchers. JTF employs a supply system so that while machine guns will always have ammo, rockets, grenades and other exotic gear requires re-supplying from time to time, via drop crates or supply trucks.

Graphics are excellent for an RTS, although we found the unit animations a little 'jerky' in what are otherwise flawless visuals. Smoke billows from tanks as they move and leave track marks in their wake. Vehicles are also free to knock down fences, signposts and other objects. Hardware accelerated physics is supported via AGEIA's PhysX card. Audio is of high quality, although the voice actors could have been better.

Controlling your units is fine mostly, although keeping track of who has what can be a little annoying. It appears Most Wanted has done its best to make unit types easy to recognise – for example, a soldier with a LAW will have the weapon as part of the unit's 3D model – but it's still easy to lose track of specialist troops.

Apart from this, Joint Task Force is a sweet looking and very playable RTS. If you're looking for a break from the denseness of normal real time strategy games, JTF is well worth a look.

## VERDICT



Fast RTS gameplay; media element; reinforcement system; customisable troops; in-depth experience system.

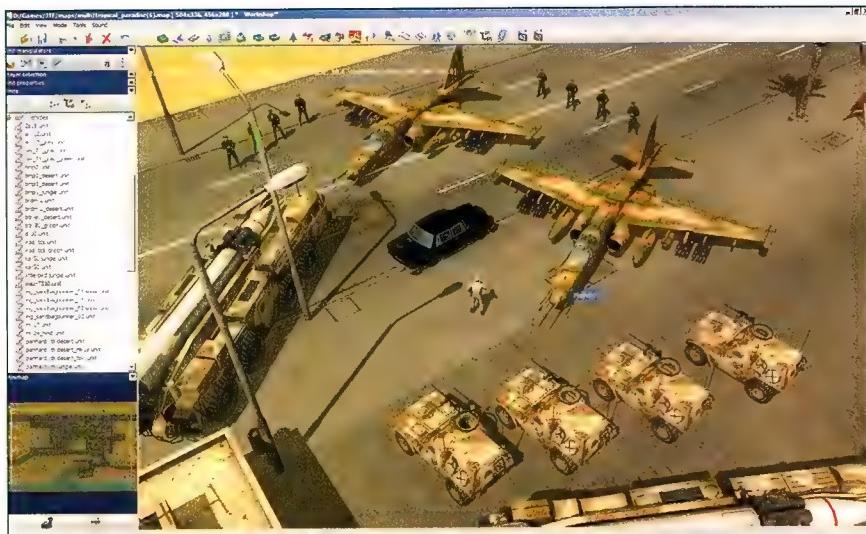


Animations are a little jerky; controls are finicky; average voice talent.

SCORE

8.0  
OUT OF 10

## WORKSHOPPING



Included with Joint Task Force is an easy-to-use map editor called Workshop. Placing units and buildings isn't at all complicated and you'll only really run into trouble when it comes to the scripting element. Unlike Warcraft 3, which comes with a 'scripting wizard', you'll need to get your head around the game's native script to program intricate events into your maps.

Of course, if you just want to whip together a multiplayer map where you and your opponent control 4000 Apache attack choppers, you won't need to write a single line of code.

## ALL IN THE DETAILS...

### Maximum detail

At its highest detail settings (full shadows, offset shaders, 4x antialiasing, 16x anisotropic; high textures) the game is a visual delight. The addition of volumetric dust makes moving vehicles and explosions look 'thicker'. The water, as you'd expect, is fantastic.



### Minimum detail

Turn all these settings off though and the game looks rather flat. Most noticeable is the loss of texture detail and the really bland water. Of course, the game runs as smooth as a lubricated, Teflon-coated gerbil up a pneumatic tube, but you lose a lot of that realism.



## INCREASE THE FOV BABY!

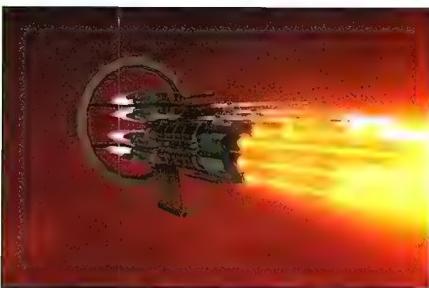
Although the game's default view is fine, we found that sometimes it didn't let you see quite enough of the battlefield. This is easily fixed by playing around inside the engine.ini file in the root directory of the game. Open the file in Notepad and look at the top for the following line:

```
float DefaultFOV = 60.000000;
```

Change the number after the 'DefaultFOV' to something like 90. This will give you a wider viewing angle of the battlefield.

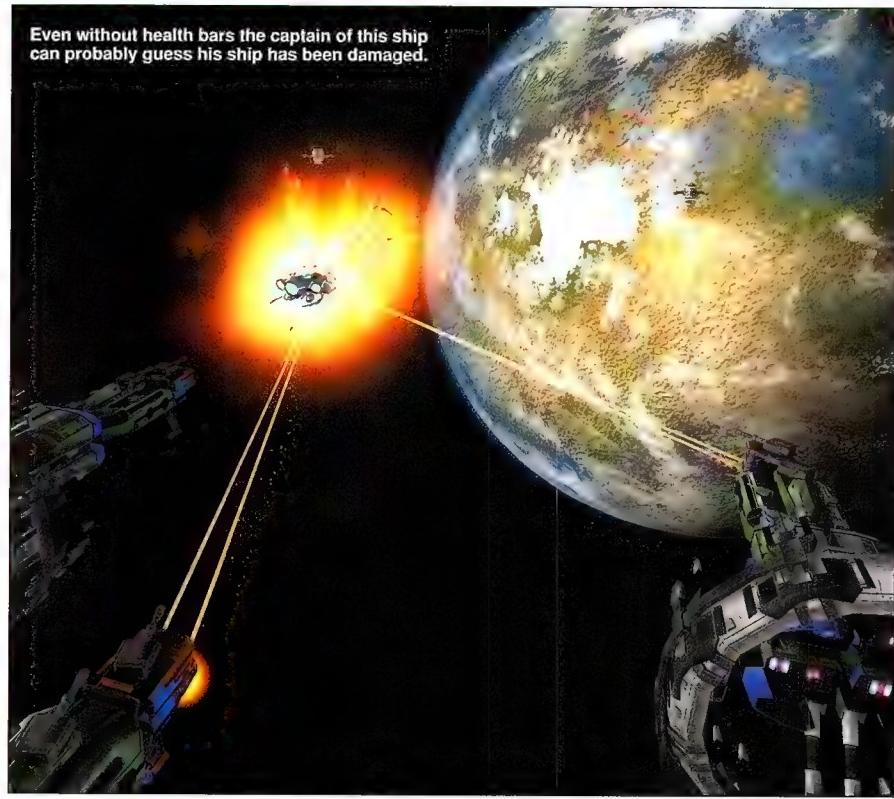
Some might consider this cheating, so if you're going to play multiplayer, let your opponents know you're using a higher FOV.





**Developer** Kerberos  
**Publisher** Lighthouse Interactive  
**Website** [www.swordofthestars.com](http://www.swordofthestars.com)

**Recommended**  
**2GHz CPU; 1GB RAM;**  
**128MB DirectX 9 card**



# Sword of the Stars

**David Kidd** waves his sword among the stars, in this new take on the 4X genre.

Where 4X titles like Galactic Civilizations 2 were meisterwerks of grand strategy, your rewards for carefully crafting your fleets and sending them off to battle was like watching someone else play Galaga. Sword of the Stars fills the void, foregoing base building, trade and politics for hardcore fleet construction and tactical combat.

It sets the kitschy space opera scene well, with the adaptable Humans, aggressive Tarka, insecty Hivers, and the aquatic, dolphinry Lir all slugging it out. Each star system features a planet that you may or may not be able to colonise, and each planet can divert its funds (via simple sliders) into terraforming, infrastructure, saving money, or building ships. The other money sink is research, which in SotS is just a warehouse for weaponry.

Building up colonies and researching tech is all for one purpose: pumping out bigger and better fleets, which you take straight onto the tactical map. On the surface, it plays like an RTS, where you select targets and issue attack stances. Depending on the amount of fleet control technology you have, your fleet could be a tiny random mess of ships, or it could be a carefully constructed formation of missile destroyers, point defence cruisers, deflector arrays and assault shuttles. Your input can be minor, letting the AI take care of targeting and movement, or you can pause the battle, select individual weapons groups on a single ship, and then zoom right down to an enemy and target, say, just its

engines. It's a clever, fun mechanic that looks and plays great – screenshots don't do justice to the cinematic battle sequences in the late game.

Unfortunately, where SotS takes two steps forward in innovation, its poor interface nearly puts it right back where it started. The 3D star chart is clunky, making us wonder why the developer didn't just stick to 2D; and building and upgrading ships requires flipping in and out of numerous screens. Furthermore, for all the potential on the tactical map, the spartan interface is a hindrance. The game manual even proudly notes the purposeful omission of health bars, where you'll have to rely on the 'immersiveness' of visual cues on your ships to determine how damaged they are. This is a mind-bendingly arrogant design decision by Kerberos, but the fortunately the latest patch provides basic coloured labels on the tactical vector screen.

In the end, though we've punished games previously due to a poor interface, SotS manages a passing mark. The streamlined strategic component is slick, and the epic battles are on par with the Total War series – and like Creative Assembly's masterpiece, it nicely straddles both the tactical RTS and the 4X strategy crowd.

The whopping release patch has gone halfway to address the interface issues, but not far enough. Here's hoping a patch in the next few months will give it the polish it needs – if not, you can halve the score.

## VERDICT



Fleet battles; streamlined strategy; mod potential.



Poor interface; painful voice-overs; lacks polish.

SCORE

8.0  
OUT OF 10



## 4X games you probably haven't played

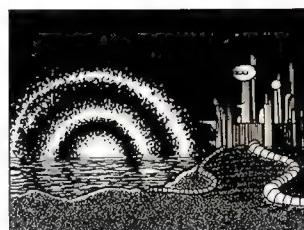
### FreeOrion

It's not complete, but it's a damn sexy-looking 4X project based loosely on Masters of Orion. Huge tech tree, slick interface, a comprehensive tactical combat model, and entirely free. Check the progress at: [www.freeorion.org](http://www.freeorion.org)



### Anacreon

Similar to SotS, Anacreon is relatively simple in the 4X department – it mainly involves conquering planets and pumping out massive fleets of galactic fury. It started out as a DOS game in the '80s and was remade a couple of years ago by its original creator, George Moromisato. More info here: [www.neurohack.com/anacreon](http://www.neurohack.com/anacreon)

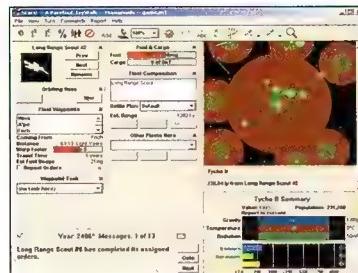


### Birth of the Federation

Easily the best game in *Star Trek* history, with only the space sim Klingon Academy coming close to its brilliance. BotF was the creation of Microprose and pitted the Federation, Cardassians, Romulans, Klingons and Ferengi against each other in intergalactic warfare. It even had the Borg!

### Stars!

It's not pretty, but Stars! is where it's at for the truly hardcore 4X freak. Ship building, research, trade routes, diplomacy – everything you could want is here. A



sequel, Supernova Genesis, was in development, but was apparently cancelled due to lack of interest by game publishers. Despite some attempts at creating a modern remake, the original is still the best. Get it here: [stars.lelv30.net](http://stars.lelv30.net)

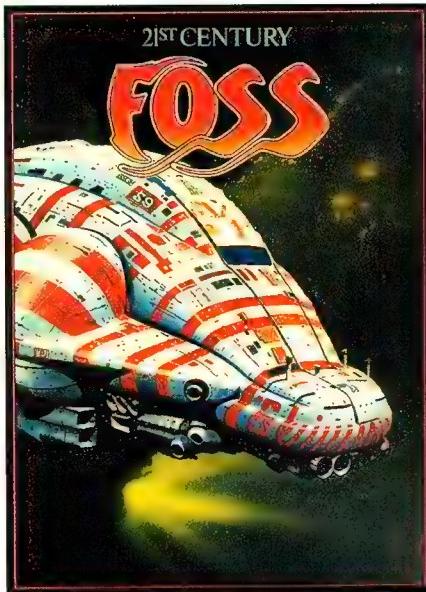
### Space Empires

This 4X powerhouse series is as much a testament to the allure of the genre, as it is to the potential of indie game developers. It features much micro-management, a huge array of mods, and a fanatic cult following. Check out the progress of the latest title, Space Empires 5, at: [www.malfador.com](http://www.malfador.com)



## What's the Foss?

Remember paying 50c for a box of old Isaac Asimov sci-fi books at a garage sale when you were 15? Of course you do. The chances are good that the cover artwork was by Chris Foss, whose futurescapes were colourful, stylistic, and like nothing else before or since. Foss may not be doing much



lately, but his style has clearly found a home in gaming, with Homeworld and now Sword of the Stars showing its roots in sci-fi's golden age of design. [www.chrisfoss.net](http://www.chrisfoss.net)

## Suck it down

We love digital distribution just as much as we like punching holes into our enemies' iron hides with our massive mass drivers. So long as it doesn't hurt our systems, we can make backups, and we can play it wherever we want, game downloads are a winner. SotS is available on Direct2Drive in the States, or GamersGate everywhere else. Both sites offer it for about \$50. [www.gamersgate.com](http://www.gamersgate.com)





## Snakes on a Plane

**CINEMA**

Starring Samuel L. Jackson; Dolores Marmol; Director: David E. Kelly; Distributor: Roadshow; Website: [www.snakesonaplane.com](http://www.snakesonaplane.com)

**B**y no stretch of the imagination – or Bolivian anaconda – is *Snakes on a Plane* a great film. Served cold to a cinema of critics you'd be hard pressed to get even a few thumbs of approval for this campy horror film. But, if you've been following the Internet hype, including fake trailers, posters and dodgy impersonations, then you'll definitely find *Snakes* an enjoyable experience. Well, more so than the average movie-goer and especially if you can drag a bunch of mates along who are in on the joke.

If for some reason you've managed to avoid all the crazy Web stuff and have no clue as to what the movie is about, that's not a big deal because the title says it all. There are these snakes, right? And they're on a plane.

That's really it. Oh, and Samuel L. Jackson is there too, reportedly happy to be a part of the production for the simple fact that the thing is called *Snakes on a Plane*.

But he's not swinging around a clapperboard or crouched behind a camera. Jackson plays FBI agent Neville Flynn, charged with the protection of Sean Jones (Nathan Phillips), a young surfer living in Honolulu. Jones is unfortunate enough to witness the brutal murder of a prosecutor by big gang leader Eddie Kim (Byron Lawson) and his thugs. As you can probably guess, the prosecutor was handling a case against Kim that would see him thrown in gaol for life. Jones escapes from Kim, but shortly afterwards an attempt is made on his life. In steps Flynn to save the day and in no time at all the FBI arranges for Jones to be flown to Los Angeles to testify against Kim.

Except there are snakes on the plane – lots and lots and lots of venomous slithering killers, from rattlesnakes to cobras to brown snakes. And they're angry.

The rest of the movie is fairly predictable, and an assortment of bit characters make up the rest of the cast. It's left to the viewer to guess which passengers will cop a face (or breast, or crotch, or eye) full of nasty snake death. There's even a 'Snake Cam', which feels more like someone wearing green cellophane glasses and staring through a kaleidoscope than an authentic snake-eye view (if such a thing is even possible).

Don't walk into the cinema expecting a classic, or even a cult film, because you'll be disappointed. If you only see it to hear Sam Jackson's 'Enough is enough' line, we'll save you the trouble of watching the whole thing and tell you now it's right at the end of the show.

If you're thinking of seeing the film, have a read of some of the hype that surrounded its release. Or, check out the blog entry that started it all: [hucksblog.blogspot.com/2005/08/snakes-on-motherfucking-plane.html](http://hucksblog.blogspot.com/2005/08/snakes-on-motherfucking-plane.html)

LB



## Brick

**CINEMA**

Starring Joseph Gordon-Levitt; Emilie de Ravin; Director: Rian Johnson; Distributor: Rialto Entertainment; Website: [www.brickmovie.net](http://www.brickmovie.net)

**P**lease, if you're going to remember Joseph Gordon-Levitt for anything, let it be *Brick* and not Tommy in the long-running sitcom *3rd Rock from the Sun* or Cameron in *10 Things I Hate About You*. Not that there was anything wrong with these roles – just that *Brick* is by his best performance.

*Brick*, an independent film by first time director Rian Johnson, perfectly showcases Gordon-Levitt's ability to seamlessly slip into unconventional roles and genres. For *Brick*, the role is of an anti-hero, the genre film noir.

Gordon-Levitt plays Brendan Frye, a streetwise high school student familiar with the ins and outs of the drug-running business – specifically heroin. 'Familiar' really doesn't do Frye's knowledge justice – he can play the game like a one-note song on a single key piano. He just chooses not to for personal reasons.

That's until he gets a disturbing call from his ex, Emily (Emilie de Ravin). Emily has run into trouble with 'the Pin' (Luke Haas) and a 'bad brick' of heroin. The call forces Frye back into the narcotics biz to help Emily out of her desperate situation.

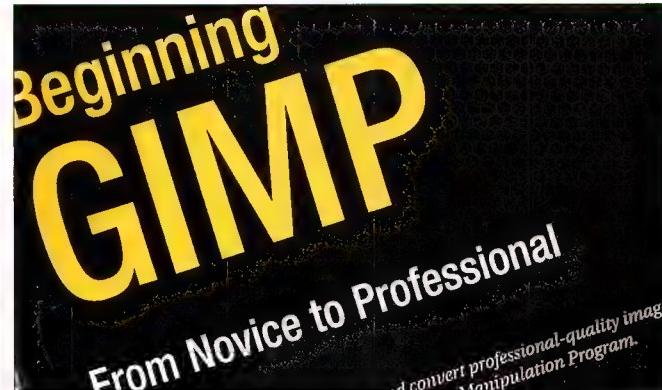
All your typical noir archetypes are there, from Gordon-Levitt's private eye/anti-hero, to dual femme fatales Laura (Nora Zehetner) and Kara (Meagan Good), and Luke Haas' 'the Pin' filling in as the villain. We certainly have no complaints about the cast – no one feels out of place. Even side characters like Matt O'Leary's 'Brain', who acts as Frye's sounding board, and Tug (Noah Fleiss), the Pin's somewhat uncontrollable muscle, add immeasurably to the film and it would suffer from their absence.

Director Johnson makes it clear through the use of the modern setting, characters and instruments that not everyone will get the noir references that so strongly drive the film. These contemporary elements help the film to stand on its feet as a typical thriller, rather than a homage to the likes of *The Maltese Falcon* and *The Blue Lady*. Johnson also manages to squeeze in just the right amount of humour – as well as one of the best wince-inducing scenes of recent times.

The film loses a few points for its obtuse start and slow finish (and some might say complete lack of planes and snakes), but patience inevitably allows the story to unfold. It would be a lie to say viewers unfamiliar with the film noir will get as much from *Brick* as those who are, so if in doubt, head down to your local video store (or raid your grandparents' VHS collection), rent out a few of the aforementioned classics, and enjoy the antics of Sam Spade first.

LB





## Thank You for Smoking

**CINEMA** Starring Aaron Eckhart, Adam Brody, Director Jason Reitman  
Distributor: 20th Century Fox, Website: [www.20thcenturyfox.com](http://www.20thcenturyfox.com)

**R**ight up until you sit down in your cinema seat and actually watch *Thank You for Smoking* you'll have little idea what type of film it's meant to be. It has Adam Brody, so maybe it'll be funny. But wait, there's Robert Duvall, perhaps it's a serious flick. Oh, hang on... isn't that Aaron Eckhart? Wasn't he in *Erin Brockovich*? Maybe it'll be hard-hitting and controversial?

To be frank, *Thank You* is all of these things – somehow, it magically taps into a combination of themes and devices to entertain and educate the audience.

Eckhart plays Nick Naylor, Vice President of the Academy of Tobacco Studies, an institution established by numerous big cigarette companies, or 'big tobacco'. In reality, Naylor is a professional spin doctor, his job being to appear in public as 'the face' of smoking and fend off claims that cigarettes are a bad thing. Although Naylor is extremely good at his job, he knows that as the spokesperson for big tobacco, he is a target for the public's anger. What he doesn't realise is the potential for that anger to manifest itself in unfortunate circumstances.

The movie follows Naylor's career, including his somewhat troubled family life. Separated from his wife (Kim Dickens), Naylor makes the resolution to get more involved with his son, Joey (Cameron Bright). As a result, Joey begins to travel with his father, witnessing Naylor do everything from paying off the Marlboro man to fielding death threats on national television.

The source of entertainment in the movie is provided by Naylor's spin work, and Eckhart plays the role flawlessly. The opening scene, for example, sees Naylor outnumbered on a Jerry Springer-like talk show by members of various health organisations and a bald 'Cancer Boy' to draw sympathy from the crowd. What should have been a televised lynching of Naylor and tobacco is somehow transformed into its promotion – all thanks to Naylor's quick wit and ability to talk circles around his less silver-tongued competition.

As you might expect, there is a message in the film – it's just that it is not about smoking. The tobacco argument in *Thank You for Smoking* simply provides a foundation for screenwriter/director Jason Reitman (and indeed Chris Buckley, the writer of the novel that the movie is based on) to satirise corporations, television and even governments and their attempts to influence through advertising, campaigning or good old fashioned bribery. The movie attempts to show that freedom of choice is as important as, say, one's health. In fact, much of Naylor's spinning relies on leveraging the common sense behind this argument.

*Thank You for Smoking* is a short, but well-executed film and while it could benefit from a tighter plot and the cinema environment does little for it, this is one film you should definitely not pass up.



## Beginning GIMP

**BOOK** Author: Adriaan Poot, Distributor: Woodcutters, Website: [www.woodcutters.com](http://www.woodcutters.com)

Let's face it – if you had the choice of Photoshop over GIMP, you'd always go with Adobe's flagship product. The only time you might not is if you didn't have Photoshop, or \$1000 or so dollars to spend on Photoshop. This makes GIMP incredibly attractive to the thrifty artist, considering the program is free.

If you're used to the intricacies of Photoshop, going to the GIMP can be quite an exhausting proposition. It's like the developers decided to take the user interface of Photoshop and do everything in exactly the opposite way. So, a nice fat book telling you exactly how to get the GIMP working the way you want it to would have to be an inviting prospect.

Immediately the value of *Beginning GIMP* is diluted by the fact that guides for the open source paint program are abundant on the Internet. The value is further thinned by the rather bad example images provided in the book. Although colour and high-resolution, the author for the most part uses the Magic Wand tool for selections rather than the Path tool – which is kind of odd considering there's a tutorial in the book on how to make selections from paths.

Otherwise, the book is very comprehensive, covering all aspects of the application. The contents pages break everything down into a series of tutorials, and the index at the back is perfect for finding every use of a certain tool. The book is so comprehensive in fact that every filter is given its own two or three pages, which most would consider a little overkill but great if you like poorly cut and scaled pictures of leaves superimposed on bird beaks.

For the ambitious, a few tutorials are included to familiarise you with GIMP's scripting support, including Perl, Python and the program's own Script-Fu so you can create your own advanced effects. The book does spend a page or two to explain what exactly Script-Fu/Python/Perl are, but for the most part the reader is thrown into the guts of GIMP scripting. For your average designer, unless you have some experience with Flash ActionScript or something similar, these tutorials will look like nothing more than Simplified Chinese without the simplified.

To be fair, anyone who can write a helpful book on GIMP deserves some respect and, while *Beginning GIMP* has little value for those who would actually use the program, we can see the less technical designer getting some use from its picture-littered pages.



A release as successful Reflections' Driver would put Atari Melbourne House back into top gear.



# Moving house

**Kate Inabinet tells you why games development in Australia is under threat.**

It's impossible to become complacent in games development. Just when you sit back for a breather and start to wonder if things are finally starting to settle down, the industry throws you a curly one. One minute you can be admiring the view from your coveted window seat while you idly blow the biscuit crumbs from your keyboard, and the next you could be standing among the ruins of your beloved company, shell-shocked and dazed, and wondering if you could ever recover enough pieces of your heart to consider another job in the business.

There are few things more demoralising in life than having your dream job blow up in your face. When it's your own fault, as much as it hurts you can take it on the chin, as pride rarely suffers more than a bruising. But when the destruction is completely beyond your control, your ego is hit by every uncertain, disillusioned, bitter and angry piece of shrapnel in the blast. The damage goes far beyond a mere financial hiccup, and it can take a long time to recover, if you do at all.

Making games is a vocation, and the rewards are more than what is taken home in your pay packet. The sheer fun, excitement and sense of satisfaction gained by working in the industry are surpassed only by the bonds formed within your team. Honest friendships built on respect, loyalty and monkey jokes, as well as the sharing of a common goal. These are the people who coax you out of the fetal position from under your desk at crunch time, or help you find that last little bit of inspiration when you thought you were completely burnt out. It's these people who are caught up in the collateral damage when a company falters.

Australia, finally catching up with the trend in the rest of the world of studio closure, has suffered too many blows to its industry over the past couple of years. Lately we have witnessed Ratbag's ill-fated

takeover by Midway in Adelaide, along with the demise of Perception recently in Sydney, and now Atari Melbourne House is fighting hard to stay in the game. It is almost impossible to imagine Victoria without Melbourne House. It virtually pioneered the Australian games industry as Beam Software back in the 1980s and has been a force to be reckoned with for more than 20 years – despite countless name changes, sales and corporate takeovers. Melbourne House has continually proven itself with quality titles like Transformers, Le Mans and Grand Prix Challenge, and the release of Test Drive Unlimited should put it back in the spotlight where it belongs.

Speculation is rife over the future of Melbourne House as it sits on the market after Atari's recent sale of UK studio Reflections, along with the Timeshift and Stuntman IP and successful Driver franchises. Although a purchase could simply be the shot of adrenaline it needs. If Melbourne House is sold to a company with vision, it has the confirmed talent pool to create something truly amazing.

Our community is staffed by the refugees of companies without the strength or support to have survived on their own, and we know only too well the horror of watching something you love slowly crumble. Despite some vitriolic comments made by a couple of disgruntled ex-employees, most of us rally behind the staff brave enough to stand by Atari Melbourne House in its darkest hour, and hope it has the strength to remain standing as one of the industry's stalwarts.

Email Kate if you want to hear those monkey jokes, or just to find out where to buy cheap bananas.  
[geekette@atomicmpc.com.au](mailto:geekette@atomicmpc.com.au)



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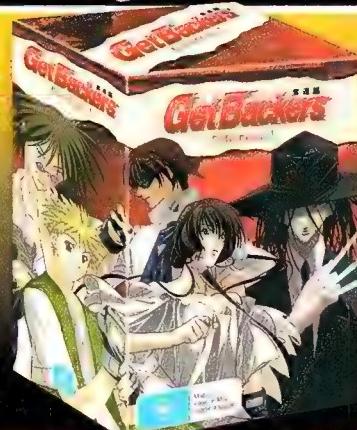


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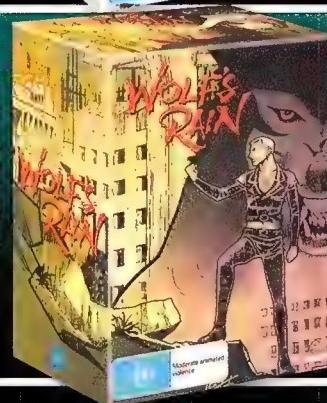
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# TECHNIQUE

HANDS-ON TUTORIALS, TIPS, AND TWEAKING FOR THE TECHNICALLY INCLINED.

## this month



▲ Uber Linux Project Part 5  
Leigh Dyer puts the finishing touches on what is the Linux box to end all Linux boxes.



▲ Defyant's Prey case worklog  
Defyant, Australia's top modder, builds a case for the Atomic/Prey competition.



▲ Making browser-friendly Webpages

Internet Explorer breaking your lovely CSS again? Fix those rendering errors up!



▲ Input Output  
Dan Rutter puts things back together. Inside are some of the things he, well, put together.



▲ Hotbox  
Modded boxes that will make you weep for joy. Made from flesh and blood, and bits of plastic.

### DO YOU NEED HELP?

Stuck? Always wished you could achieve something but didn't know how? Wish you had a handy guide just sitting there to dig you out of a hole? Need new jeans? We can help on all but the last. If you have an idea for our monthly tutes, why not drop Craig a line on [csmms@atomicmpc.com.au](mailto:csmms@atomicmpc.com.au). Or alternatively you could just write to him, if you're not the line-dropping type.

**C**hange is afoot at *Atomic*, although we were a little confused for a while when we thought change was actually a hand, or an ear. But this confusion cleared once we realised how excited we were about those changes, regardless of which part of the anatomy they were. Well, maybe except the appendix – we never did see the point.

The tutorials section, for example, has undergone some tweaking. Gone are the fixed sections of Linux, Windows and hardware tutorials that were restricting the types of content we could cover. With new frontiers exposing themselves, like Macs running Intel, or Bill after one too many beers, it only made sense to break away from these static categories and allow our fantastic tutorial guys to go nuts.

This month we of course wrap up the Uber Linux Box project by the amazing Leigh Dyer. The original was run long ago by grand swami Ashton Mills, and Leigh has more than lived up to the legacy with this updated guide. It's been quite a journey, starting all the way back in issue 65, but now we're finally done. Until of course, everything changes completely and we have to do it again! If you've been following this epic quest, be sure to read the thrilling conclusion, starting on the next page.

After Uber Linux comes Luke 'Defyant' St Clair's worklog of the *Atomic/Prey* case that we gave away to one lucky person. Along with some of the hottest and tastiest PC components was an excellent custom laser-cut Perspex window of the Prey bird and *Atomic* logo, all sitting pretty in the monolithic Silverstone Temjin TJ07 case. It has to be seen to be believed!

Finally, as a change from the Linux, Windows and hardware you're used to seeing, is a small, easily digestible Web design tute for all you budding developers. Docatypes and standards are important, so if you're having trouble making your pages look the same in multiple browsers, be sure to check this tutorial out.

Coming up the rear (ooh, er) is Input Output with Dan Rutter, the world's most besotted tech fixer and hair stylist extraordinaire. Seriously, if it were possible, we'd all wear our hair like that.

Then of course there's Hotbox, the old favourite, where you guys get to strut your ridiculously cool modded stuff, with the winner taking home a hot new motherboard for their workshop efforts.

Whew. So much excitement in just a few pages! How do we cram it all in? With crowbars, mostly. Crowbars and love. Mmm.

# LINUX TUTORIAL

Feel the  
force of  
open source!

## The Uber Linux Box Challenge Part 5

**Leigh Dyer** wraps up the massively in-depth and immensely famous Uber Linux project.

In building our Uber Box we've covered a lot of ground in the last four months: tasks that Linux was built for, like RAID-backed file serving, Web serving, and firewalling. In this last part of our Uber Box series, we'll look at some less traditional uses for a Linux server.

### The remote desktop shuffle

While there are heaps of great network-controllable server apps for Linux, there are some nice GUI apps for which there aren't ideal replacements. You could run these on your Uber Box by firing up the GUI and hooking up a monitor, but we have a much better solution: remote desktop access.

VNC is the easiest way to get a full remote desktop. Unlike the Windows version, which shares your physical desktop, the Linux version of VNC can create a virtual GUI that skips the video card and is only available through the network. The desktop stays running when you disconnect, with everything appearing just as you left it the next time you connect.

SSH in and follow these steps to get up and running:

- 1 Install the VNC server package:

```
sudo apt-get install vnc4server
```

- 2 Run 'vncpasswd' to set your VNC login password.

- 3 Run 'vncserver' to start the server. Once it's launched, you'll see a message telling you that your new desktop is ready.

- 4 Download a VNC client for your desktop system. For Windows, the UltraVNC standalone client from [ultravnc.sf.net](http://ultravnc.sf.net) is a good

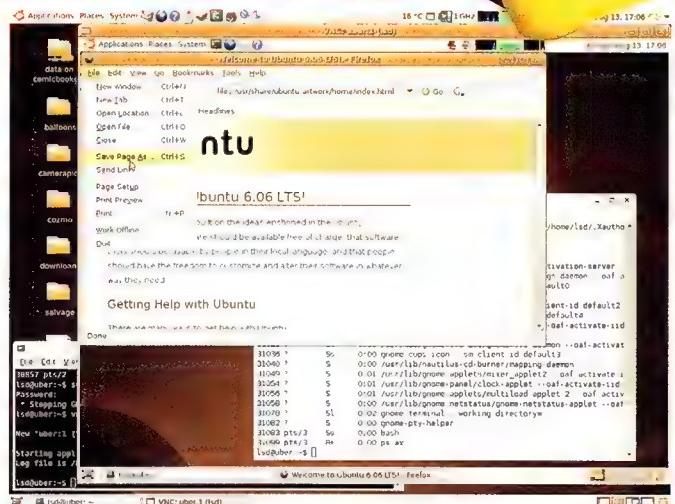
bet. If you're running Ubuntu on your desktop now (well done!), the Terminal Server Client tool in the 'Applications/Internet' menu should do the job.

- 5 Connect to 'uber:1' using your VNC client. You should see a desktop, though it will be running a very basic GUI rather than a standard Ubuntu desktop. Shut down the server by running 'killall Xvnc'.

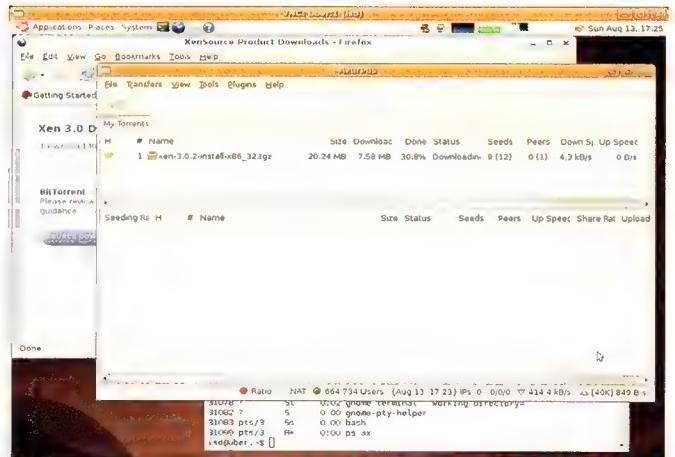
- 6 To enable a full desktop, use 'nano' to edit the '.vnc/xstartup'



▲ The Terminal Services client in Ubuntu handles VNC as well.



▲ Ahh... that's more like it!



▲ VNC makes Azureus so Uber it needs umlauts.



▲ It's a desktop alright, but it ain't much of one.

▲ The 'Chicken' of the VNC is a great client for Mac OS X

file in your home directory. After the first line, add the following lines:

```
exec /usr/bin/gnome-session
```

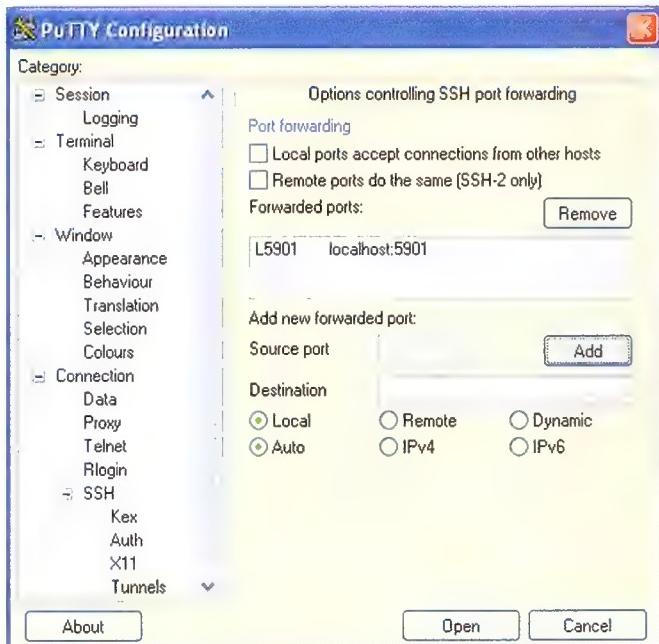
- 7** Start the server again with the 'vncserver' command, and connect to it with your client. You should see the full Ubuntu desktop appear. There may be some warning messages about the power manager, but you can safely dismiss these.

Now that we have a remote desktop, what can we do with it? A great example application is Azureus, the popular Java-based BitTorrent client. Running it on your Uber Box will mean that you can turn off your desktop and still keep your downloads running 24/7.

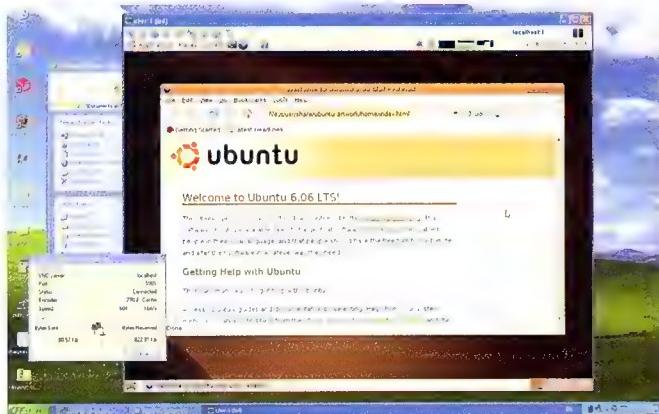
- 1** Install the Azureus and Sun Java packages. Azureus is in 'universe', and Java is in 'multiverse', so you'll have to have these enabled for this to work:

```
sudo apt-get install azureus sun-java5-jdk
```

- 2** Configure Sun Java as the default Java implementation on the system by running 'sudo update-alternatives --config java' and selecting the 'java-1.5.0-sun' alternative.



▲ SSH tunnelling. Shovel not required.



▲ UltraVNC is definitely the best Windows VNC package.

- 3** Start Azureus from the Applications/Internet menu from inside the VNC session.

A neat trick is to access your VNC desktop from outside your LAN, across the Internet. You could do this by opening the VNC port (5901 in our case) on the firewall, but a better idea is to use SSH tunnelling. Using SSH not only means that you need a valid SSH login to connect, but it also encrypts, and optionally compresses, the traffic.

The tunnel listens on a port on the local machine, and forwards any connections through to a specified host and port at the other end, relative to the host running the SSH daemon. Here we SSH in to the Uber Box and forward port 5901 on the client system to the same port on the Uber Box. The '-C' flag adds compression:

```
ssh -C -L 5901:localhost:5901 my.uber.box
```

If your client is a Windows box, you can configure tunnels in PuTTY from the 'Tunnels' settings pane.

## Serving... servers?

Here's a brain-bender: a server that serves servers. It sounds crazy, but it's the way of the future – using virtualisation to run multiple OS installs simultaneously on the one server. It's a great way to make better use of your hardware, and as each virtual server is completely isolated, it can also improve security.

VMware and Virtual PC can do this, but the best option for server work is Xen. It's much faster than other options, but it can only run specially modified OSes, and Linux is the only well-supported OS at the moment. The next version of Ubuntu will ship with Xen support, but for now we'll have to install manually:

- 1** Install some support packages that Xen requires:

```
sudo apt-get install iproute python python-twisted bridge-utils
```

- 2** Go to [www.xensource.com/xen/downloads](http://www.xensource.com/xen/downloads) and download the latest tarball release (currently 3.0.2). There's a BitTorrent link for the download – perfect for your new Azureus setup.

- 3** Extract the Xen tarball and change in to the directory it will create:

```
tar zxvf xen-3.0.2-install-x86_32.tgz
cd xen-3.0.2-2-install
```

- 4** Run the installer:

```
sudo ./install.sh
```

The screenshot shows a terminal window with the title 'Ubuntu' and the command 'File: /boot/grub/menu.lst'. The window displays the GRUB configuration file, which includes sections for kernels and the 'AUTOMAGIC KERNEL LIST'. The file is being edited with the nano text editor.

```
# kernel /vmlinuz root=/dev/hda2 ro
#
## Put static boot stanzas before and/or after AUTOMATIC KERNEL LIST
title Xen 3.0 / XenLinux 2.6
root (hd0,0)
kernel /xen-3.gz
module /vmlinuz-2.6-xen root=/dev/mapper/ubuntu-root ro
module /initrd.img-2.6.16-xen

## BEGIN AUTOMATIC KERNELS LIST
## lines between the AUTOMATIC KERNELS LIST markers will be modified
## by the debian update-grub script except for the default options below.
## DO NOT UNCOMMENT THEM, Just edit them to your needs
## ## Start Default Options ##

# Get Help WriteOut Read File Prev Page Cut Text Cur Pos
# Exit Justify Where Is Next Page Uncut Txt To Spell
```

▲ Tweaking GRUB to boot the Xen kernel.

- 5** Update the initrd image and list of kernel module dependencies for the new kernel Xen has installed:

```
sudo depmod -a 2.6.16-xen
sudo mkinitramfs -o /boot/initrd.img-2.6.16-xen 2.6.16-xen
```

- 6** Edit the '/boot/grub/menu.lst' file. Before the line that reads '### BEGIN AUTOMAGIC KERNELS LIST', add the following lines:

```
title Xen 3.0 / XenLinux 2.6
root (hd0,0)
kernel /xen-3.gz
module /vmlinuz-2.6-xen root=/dev/mapper/ubuntu-root ro
module /initrd.img-2.6.16-xen
```

- 7** Disable the thread-local storage system libraries, which will run slowly under Xen:

```
sudo mv /lib/tls /lib/tls.disabled
```

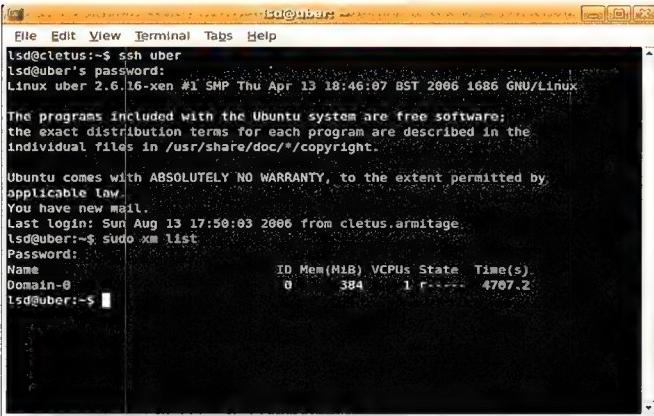
- 8** Edit the /etc/init.d/xend file and add the following lines near the top:

```
if [ ! -d /var/run/xenstored ] ; then
mkdir /var/run/xenstored
fi
```

- 9** Configure the Xen system services to start on boot:

```
sudo update-rc.d xend defaults 20 21
sudo update-rc.d xen-domains defaults 21 20
```

- 10** Edit the '/etc/modules' file and add a line at the end that reads 'loop', without quotes. This will load the loopback device driver on boot, which Xen uses to handle the disk images used by your virtual servers.



▲ If you can read this, Xen is working.

- 11** Reboot your system.

If everything has gone to plan, it should boot as normal, but with the Xen kernel in place. You can check that everything has gone to plan by running 'sudo xm list' – this will list the Xen virtual servers, or 'domains', running on your Uber Box. For now it should just show 'Domain-0', the special domain that represents the top-level Linux system.

Now that you can run Xen domains, you'll need to create some. Because you can't just boot a domain from an install CD this requires some creativity. We'll use xen-tools, a package that can run automated Ubuntu installs inside a disk image.

- 1** Install the packages required by xen-tools:

```
sudo apt-get install debootstrap make libtext-template-perl perl-modules libterm-size-perl
```

- 2** Download the latest xen-tools release from [xen-tools.org](http://xen-tools.org). Extract the tarball and run the installer:

```
tar zxvf xen-tools-2.2.tar.gz
cd xen-tools-2.2
sudo make install
```

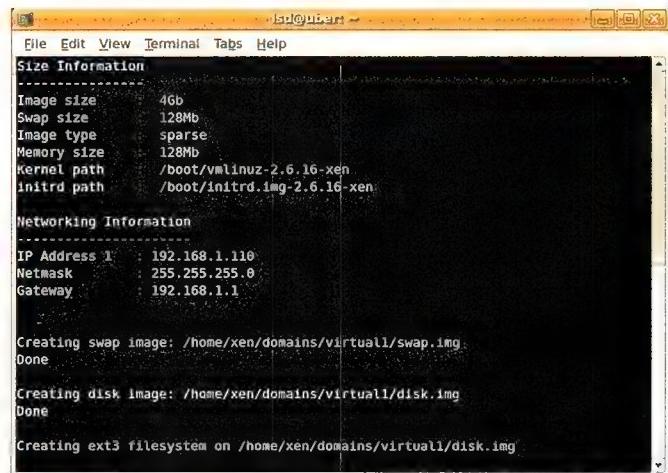
- 3** Edit the /etc/xen-tools/xen-tools.conf file and make customisations:

- Uncomment the 'dir = /home/xen' and 'debootstrap = 1' lines
- Edit the 'dist = sarge' line to read 'dist = dapper'
- Uncomment the 'gateway' and 'network' lines and modify them to match your network
- Uncomment the 'accounts = 1' line
- Uncomment and modify the 'kernel' and 'initrd' lines to point to your Xen kernel and initrd files under /boot, ie:

```
kernel = /boot/vmlinuz-2.6.16-xen
initrd = /boot/initrd.img-2.6.16-xen
```

- Edit the 'mirror' line to point at your local Ubuntu mirror, as listed in your /etc/apt/sources.list file

- 4** Create the /home/xen folder by running 'sudo mkdir /home/xen'.



▲ Xen-tools can install Dapper without running through the installer – neat!

- 5** Create and install a new guest domain:

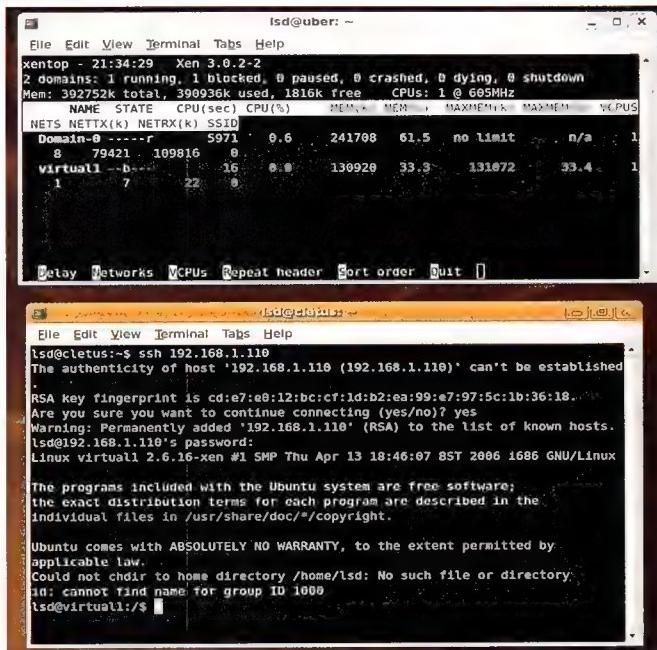
```
sudo xen-create-image --hostname=virtual1 --ip=192.168.1.110
```

This will create a 4GB disk image and install a copy of Ubuntu Dapper in to it via the network, so it may take a while to run with a slow machine or connection. When it finishes, you can start the domain with the 'xm' command:

```
sudo xm create virtual1.cfg -c
```

You should see the domain's boot messages appear in your terminal, followed by a login prompt. Log in as 'root' (no password required) and enable 'sudo' access for your username by running 'visudo' and adding a line like this to the end of the file, substituting your username:

```
leigh      ALL=(ALL)  ALL
```



### ▲ SSH in and set up anything you like in your virtual server.

Hit Ctrl-[] to disconnect from the console, and then SSH in to it using the IP address specified on the command line. From there, you can install anything you like, just as if it was a real system.

A good idea if you're doing both Web and file serving is to move the Web serving in to a Xen domain. That way, if the Web server has a security flaw and a hacker managed to compromise it, they'll be limited to just that domain, with no access to files or other Xen domains outside that.

The 'xm' command has many other useful commands for managing your Xen domains, including 'xm top' to list CPU activity, 'xm shutdown' to shut down a domain, and 'xm mem-set', which changes the amount of RAM allocated to a domain.

## Video on demand

You can build one hell of a PVR with a Linux box, a TV tuner card, and some software. Digital tuners are definitely the way to go: they deliver the video as a crisp, pre-encoded MPEG-2 stream, while cheap analog tuners give you enormous raw streams that require realtime compression. Most PCI digital tuner cards work well under Linux, as do some USB tuners, though they still seem a bit hit-and-miss compared to PCI. Install your card and follow these steps to get it working:

**1** Use the 'lspci' command to identify the hardware on your tuner card. Most digital cards are based on the Brooktree BT8x8, Conexant CX2388x, or Phillips SAA71xx chipset families. 'lspci' lists the details of all PCI devices on your system, so it should let you discover which chipset you have.

**2** Load the appropriate driver module, which will be one of 'dvb-bt8xx', 'cx88-dvb' or 'saa7134-dvb' for the Brooktree, Conexant, and Phillips chips respectively. Ubuntu may have detected the hardware at boot, but loading the driver again won't hurt. Use the 'modprobe' command to do this:

```
sudo modprobe dvb-bt8xx
```

**3** Check the output of 'dmesg'. If your tuner card has been detected correctly, you should see some messages here confirming it.

**4** Install the DVB utilities package, and the MPlayer and MEncoder video packages:



### ▲ Watching and recording TV with MPlayer and MEncoder.

```
sudo apt-get install dvb-utils mplayer
mencoder
```

**5** Perform a channel scan, changing the base scan file as appropriate for your location, and store the results in the MPlayer settings folder:

```
mkdir .mplayer
scan /usr/share/doc/dvb-utils/examples/
scan/dvb-t/au-Melbourne >~/mplayer/
channels.conf
```

The scan will take a few minutes, and assuming that the card configuration and antenna setup are correct, it should detect various stations as it goes. You can open the channels.conf file to see the full list of detected channels.

**6** Plug in a monitor, or connect to your VNC desktop, and take the tuner card for a quick spin using MPlayer:

```
mplayer dvb://"SBS DIGITAL 1"
```

**7** To record a stream off to disk, you can use MEncoder. The simplest example takes the MPEG-2 video and audio streams from the air and writes them directly in to an AVI file:

```
mencoder dvb://"SBS DIGITAL 1" -o tv.avi
-oac copy -ovc copy
```

**8** If you have a bit of spare CPU grunt, you can try encoding to MPEG-4 in realtime to reduce the recorded file size. We've added some scaling as well, to reduce the amount of video data being encoded, and hence improve the performance.

```
mencoder dvb://"SBS DIGITAL 1" -o tv.avi
-oac copy -vf scale=512:288 -ovc lavc -
lavcopts vcodec=mpeg4:vbitrate=1200
```

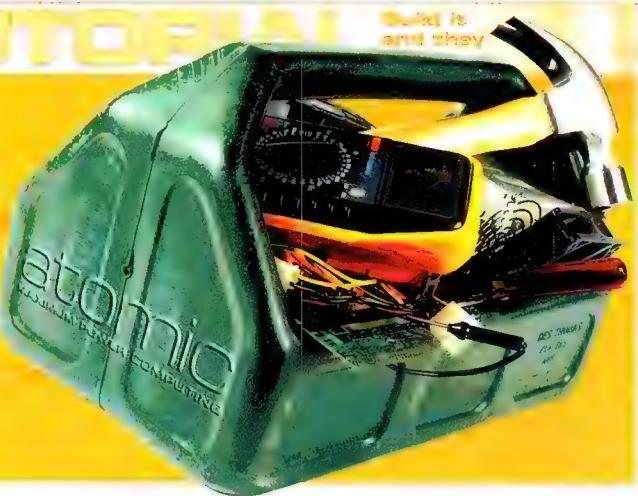
With these commands you should be able to do a bit of basic video recording, sharing the files via the LAN for playback on your desktop system. If a move from the server room to the lounge room isn't out of the question for your Uber Box, you could even look at MythTV, a full Media Center-style PVR with stacks of features. Getting MythTV up and running is a big job though, so it really demands its own tutorial – in fact, there's one back in issues 53 and 54!

That brings us to the end of our Uber Box series, but we hope it's not the end of your adventures into the world of Linux. There's a whole world of stuff to do on a Linux box, so jump online and see what's out there, and of course, make sure you swing back this way each month for more Linux tutorials.

# HARDWARE TUTORIAL

## Atomic Prey Case: The Worklog

Luke 'Defyant' St Clair mods for fun. He kindly lent his skills this month to craft the PC for Atomic's Prey case competition. See the results!



**P**rey, the game, is all about the eye candy. Building a mod that could do this justice and still remain a factory-built-looking case with full functionality like an everyday desktop PC, was going to be a real challenge.

It was decided that the main feature for the *Atomic Prey* custom modded case was going to be its side window. This couldn't be just any old window. The Prey bird is the most recognisable image of the game and would be the inspiration for what was a one-off, three-stage, tri-coloured custom laser cut Prey side panel.

A custom front panel was also added with a window feature to allow the addition of an LCD display with not one but two stealthed optical drives. Rounding the case mod off was the addition of a full-side custom laser cut *Atomic* logo.

### The Art

This was a different side to modding for me. I rarely draw any type of plan or lay any ideas down using any graphic programs when I mod. It's mostly fly-by-the-seat-of-your-pants stuff for me. This mod posed some challenges. I actually had to sit down at the computer and design out all the graphics for the laser cutting to work. All the templates had to be drawn and converted to EPS files. I decided that it would be best for me to take the basic pattern measurements, draw them up in Photoshop and send them to Jetset Graphics ([www.jetsetgraphics.com.au](http://www.jetsetgraphics.com.au)) to convert into the final EPS files.



The plan was to cut new 'dummy overlay' panels for both sides of the case. The dummy panels were cut to the exact size and then bolted to the original panels. These new panels became homes for the new Prey window and *Atomic* logo.

To mimic the original Blue logo, the Prey bird window was cut as a 3mm thick clear frame. The frame was then inlaid into the dummy side panel, the stencil filled with see-through blue Perspex – very much like a stained glass window! A similar method was used for the opposite side of the case that shows the full size laser cut *Atomic* logo.

With the art done and front/side panel measurements taken it was off to my favourite modding supply shop! Right here in Sydney, less than five minutes from home for me is the Plastix Centre. These guys are a one-stop shop for anything plastic



you could need for modding, a true supermarket of goodies. The 'x' at the end of the store's name makes it particularly special.



The SilverStone TJ07B oozes style and quality, and this is reflected with its extreme modding flexibility. It's just short of being a full size tower, but this was perfect for our needs. A fitting case for a truly awesome-looking game.



Some of the outer features of the case are its classy stained-black powdered finish; full top and side mesh vent cooling system with six quality fans and a stealthy type USB/Firewire front access point.

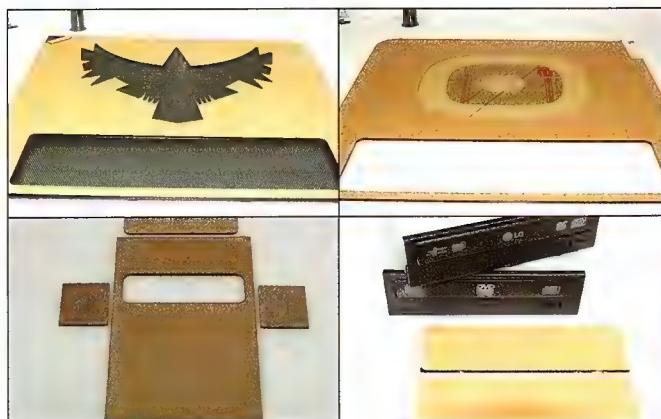
With the case on the workbench and the side panel removed you can instantly see that this is a serious case. Smart thinking with modular design built from quality material makes it a great case for modders and non-modders alike.



**3** Finally the call came through from Plastix to come and pick up the laser work. Exciting times were ahead. The laser work was everything I expected and more! The Prey bird was a work of art, the laser cut this baby micro point perfect.

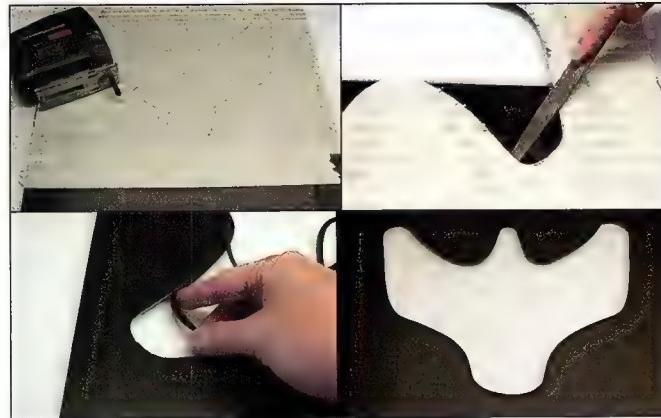
The huge *Atomic* side logo would look stunning and the new front-windowed panel and optical drive stealth doors were perfect.

Next up was to mask-up the side panel, mark out the inside line of the



custom laser Prey cut. This was in preparation for the hole/window that was to be cut for the Prey design. Once all the marking was done the design was rounded off freehand and then cut using an electric jigsaw with a fast cut metal blade. The rough edges were filed smooth and rubber edging applied to finish the cut.

With the side panel cut and ready, the long process of gluing the jigsaw

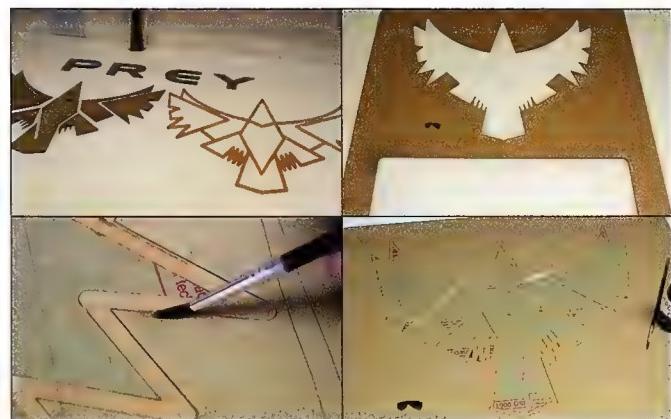


puzzle that was the new side window could start. The glue used was water-based acetone. Rather than gluing, it fuses the two surfaces together.

The best way to do this type of job is by applying the glue using a fine tip paint brush. Dipping the brush then running it along the joining edges that are to be fused, making sure there is more than enough glue to run

off the brush and down into the tight fitting grooves. The glue sets almost instantly and the protective paper (which gets peeled off later) soaks up most of the overflow to prevent any extreme staining. Dry puddles can later be buffed away.

Next is to move onto the Prey letters that will sit on top of the Prey



window. Again cut from 3mm Perplex, but this time in a solid blue so as to allow them to contrast against the three other colours.

After removing the protective paper from the backs, the letters were layered in sequence across the window. Again, I used the brush and glue technique along the inner and outer edges to glue them into place. Once dry, the whole dummy panel was bolted in all four corners using countersunk black hex head bolts to the original metal side panel.

The same method that was used for the Prey window was also used



to make the *Atomic* logo. Cut from the same 3mm satin finish as the opposite side, the panel is layered out with its green/black inner ring and green middle dot.

Once again the same method for gluing the four pieces together was





used. First goes the outer green ring then the inner black ring and finally the middle inner green dot.

All three pieces were then brush glued.

**4** Now that the sides of the mod had had some attention it was time to pay some to the front of the case.

The only thing I have to admit I didn't like about this case or any full size towers are the four or so leftover front bays that are never used. Nothing spoils a nice case more than the empty sight of a bunch of filler plates. *Atomic* generously added not one but two DVD burners to this awesome prize, although this makes things a little easier there are still five bays leftover!

I decided to break up the unused bay look by adding a new dummy panel with a tinted rounded window that would display an LCD. This would also add some extra functionality to the mod.

The first of the photos below shows the new front dummy panel with the window hole and the two side tabs. These were glued to the back of the dummy panel as brackets. A new tinted window was press fitted into the hole and would allow the display to be seen and function with its matching remote.

I should point out here, that with the provided software the new owner of this beast will have the option to turn the PC on, control and turn off their new PC with the simple push of the remote's buttons. Now that's what I call convenience.



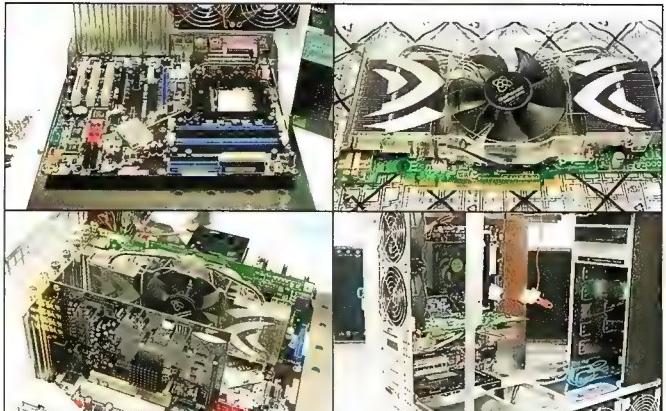
The next job was to stealth the front DVD-RW drives. I decided to go with a 'non-invasive' method. A lot of people don't like stealthed drives so I've done this mod in a way that it can easily be reversed. The drives are first installed and mounted as far back as possible – this required some dremelling of the original mount holes. This allowed the two units to be pushed back behind the original front panel line. This then allows the new 3mm thick stealth panels to sit flush against the rest of the face.

Double-sided silicone tape not only allows the new stealth doors to be attached but also allows for the doors to have some movement. The corners of the doors are soft pressed, which pushes against the original

eject buttons to open the doors. Small holes are drilled to match the DVD LED lights. It's nice to be able to see when your DVD is active especially when burning.



**5** Wow! I was impressed with the line-up of hardware that was going into the Prey case. To say the least, this beast is going to kick some serious frames per second, or small animals that try to sleep inside of it. With the modular design and great layout of the case this was a breeze, no 'way-out' motherboard or wire stealthing here, this case needed to remain as practical as it could. A tidy clean wire job is the best way to go here.





**5** With the hardware installed it was just a matter of loading the supplied software, attaching some internal lighting screws on the side panels and peeling all the leftover brown protective paper. This last part was my favourite – and a great way to finish off what has been a very fun mod to do. Building the Prey PC has been a great learning experience for me as a modder and a great way to show other modders just how flexible and creative you can get with Perspex nowadays. Although laser cutting can be expensive the end results can be spectacular and the only limitations design wise is your imagination. A big shout out from me goes to Phillip at Jetset Graphics for his expertise on re-sampling the intricate EPS files, to the guys at Plastix for getting all the laser cutting done in record time and to my good mate Greg Wells who gave up a Sunday to help get this project finished on time.

Also to Ben at Atomic and the crew there, and Ben at 2K Games! You guys have hosted an awesome comp and I'm glad to have been part of it.



atomic



# Write W3C-compliant Web pages!

**Logan Booker** shows you a few tips on how to make your pages browser-friendly.

Any Web designer can tell you that the bane of their existence is the lack of one Web browser to develop for. Microsoft tried its best to make this the case during the '90s with the Mosaic-based Internet Explorer. Once IE had close to 100 percent of the market however, MS happily left the browser to rot. This lax attitude allowed alternatives like Firefox and Opera to innovate, making IE look rubbish in their wake.

Now, even with IE 7 on the horizon, neither Firefox, Opera nor IE are completely standards compliant. This doesn't mean you should make the job of rendering pages any harder. Here a few things you can do to make the rendering your page easier.

## Force a Document Type Definition (DTD)

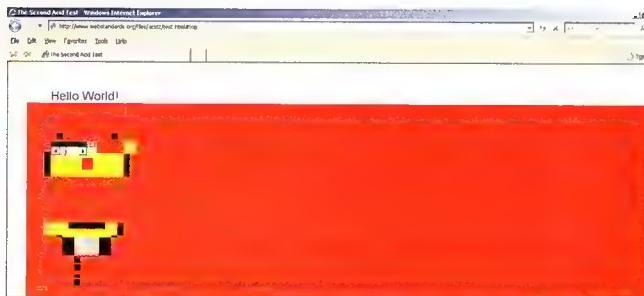
This should always be the first thing you do before you start designing your page. A DTD lets the browser know what rules to follow when rendering the HTML. Without it, the browser will switch to a 'hybrid' or 'quirks' mode and attempt to render the HTML in its own special way.

A forced DTD can fix a number of rendering problems, from margin and padding fluffs in CSS (Cascading Style Sheets) to element alignment. Below is the DTD for XHTML 1.0 Strict (highlighted in orange), and is what we recommend for any new pages you may create. Note that this code also includes the bare minimum HTML for a page that will get the okay from the W3C (World Wide Web Consortium, responsible for the management of Web standards) Markup Validator. The Strict DTD also tells Internet Explorer and Opera to use the W3C's box model (see What's in the box?).

```
<?xml version="1.0" encoding="UTF-8"?>
<!DOCTYPE html
  PUBLIC "-//W3C//DTD XHTML 1.0 Strict//EN"
  "http://www.w3.org/TR/xhtml1/DTD/xhtml1-
  strict.dtd">
<html xmlns="http://www.w3.org/1999/xhtml"
  xml:lang="en" lang="en">
  <head>
    <title>Webpage</title>
  </head>
  <body>
  </body>
</html>
```

## What's in the box?

One of the big headaches in page rendering is the CSS box model. According to the W3C, a browser should not include padding, margin or border sizes in the width of the box. While Firefox and Opera agree with this, Internet Explorer doesn't.



▲ Wah! Internet Explorer 7 fails the Acid2 test with flying, uh, something.

While a Strict DTD should go a long way to fixing this discrepancy, it doesn't always. Sometimes you need to force the browser to use one model throughout the document.

Now, there exists a CSS3 attribute, 'box-sizing', that allows you to define which box model an element should use. If the DTD isn't doing its job for whatever reason, add this to the CSS definitions of the problem elements:

```
box-sizing: content-box;
```

This will force the browser to use the W3C box model for that element. If you find that this model isn't to your liking, you can switch to the one that includes all the dimensions of the element by replacing 'content-box' with 'border-box'.

Firefox also supports its own CSS attribute, called '-moz-box-sizing' that functions identically to the above.

## Centre, damn you!

Although this has since been fixed in IE 7, Internet Explorer 6 and below don't follow standard procedure when it comes to centring elements in the middle of the screen. The traditional way of doing this is setting 'auto' for the left and right margin attributes of the element in question and giving it a fixed width:

```
margin-left: auto; margin-right: auto;
width: 600px;
```

In Opera and Firefox, this will centre your element in the middle of the browser window, even if you decide to resize it. In IE 6 however, it does sweet FA.

The solution is to use the 'text-align' attribute. Now, you'd think that this would only align text, and it does, unless you're using IE. IE will apply the centring to every element, be it text, a <div> or a chocolate-coated roasted macadamia. So the trick is to use a <div> around the element you wish to centre.

```
<div style="text-align: center">
  <div style="text-align: left">
    <p>Content goes here.</p>
  </div>
</div>
```

Note the inclusion of a second <div> to correct the text alignment for all other elements inside our 'centring' element.

## Verify!

Another way to sort out browser problems is to run your page through the W3C's Markup Validator ([validator.w3.org](http://validator.w3.org)). Although the service isn't designed to check for visual problems associated with non-compliance, it will check the CSS and HTML against the DTD specified. It's not at all unusual to fix a syntax error the validator has uncovered in your HTML and have it solve a rendering problem as well.

## It's all in the DTD...

Really we've only covered some of the basic things you can do to fix your browser compatibility woes. There are plenty of other, more intricate ways of getting things to appear one way in one browser and a different way in another. These usually rely on browser 'hacks', and aren't recommended.

So, be a good Web developer and stick to those standards!

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Corporate Software  
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Computer Parts and Land  
[www.cpl.com.au](http://www.cpl.com.au)

Alepine Peripherals  
[www.alepine.com.au](http://www.alepine.com.au)

Amexcom  
[www.amexcom.com.au](http://www.amexcom.com.au)

Harris Technology  
[www.ht.com.au](http://www.ht.com.au)

PC Market  
[www.pcmarket.com.au](http://www.pcmarket.com.au)

# shop atomic

Shop Atomic's Web crawler scours Australian online shops to find the best prices on PC components for you. Use it to compare prices then take your business to the shop that deserves it.

**[www.atomicmpc.com.au/shopping.asp](http://www.atomicmpc.com.au/shopping.asp)**

Use Shop Atomic to find prices for cases, USB drives, CD & DVD drives, routers, network cards, CPUs, video cards, PC and console games, TV tuners, motherboards, notebooks, speakers, scanners, RAM and loads more!

**USE THE MONEY YOU SAVE TO BUY MORE GEAR! IT'S SO EASY IT'S FUN!**



# WTF... help!

**Daniel Rutter** already knows what's wrong. Send him your technical problems on [io@atomicmpc.com.au](mailto:io@atomicmpc.com.au) and chances are he'll have a solution waiting to go.

## We recommend a Frankenstein knife switch

I'm looking for software to put to sleep a hard drive and wake it only when needed. I schedule my backups for the early morning, and I'd like to power up the external drive only when I need to back up my data. I could use Windows' power management, but it manages ALL the disks in my system.

I took a look around even in some programming freaks forums but I cannot get a reply. If the system can do it by itself, surely I can force it manually in some way. Any clue?

Diego Baios

Sounds easy, doesn't it? It isn't. Doing this in Windows seems to be pretty much impossible even with internal hard drives. You can use the power management settings, which generally work fine, but you can't have a one-button manual spin-down solution.

Powering an external disk up and down with any kind of software is, in contrast, completely impossible.

USB and Firewire external drives don't give the PC any way to spin them down. They

may have their own timers, which may or may not be configurable with software from the manufacturer, but otherwise you're completely out of luck. Most of them don't even spin down when the computer they're connected to turns off. All you can do is take advantage of their hot-plugability and just turn the darn things off manually when you're not using them. Which, as you say, is impractical for backups at 0300 hours.

## Putting the toothpaste back in the tube

What are your thoughts on the Viatek ([viatekproducts.com](http://viatekproducts.com)) ReNu-It Disposable Battery Recharger?

My kids have billions of toys that need AA batteries. Recharging cheap alkalines would be nice.

I have a regular NiMH/NiCad charger. Will alkalines blow up if I put them in it?

Matthew

Yes, alkalines will not be happy if you put them in a normal charger. That's why they always tell you not to in the warning on the side.

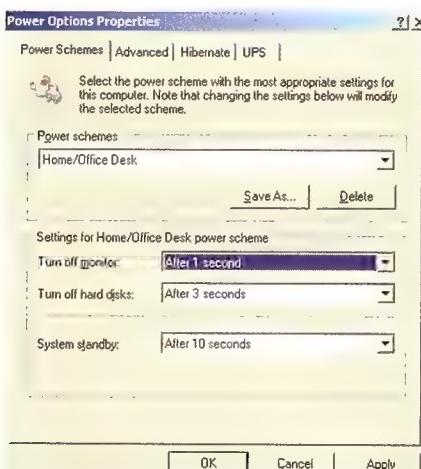
(Though when I tried to blow one up by pushing five amps through it backwards, all it did was leak. Darn.)

The Viatek 'Recharger', like all other 'chargers' for ordinary disposable batteries, is not very useful, and not actually technically a charger at all.

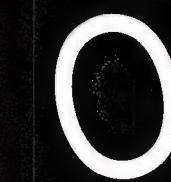
Alkaline batteries have a non-reversible reaction, like any other primary cell. You can't charge them. All you can do is thwack them with a bit of voltage to burn off metal dendrites and kick the remaining reagents into reacting a bit more completely. Which isn't worthless, but isn't very interesting either.

(Alkaline cells with a slightly different chemistry actually can be recharged, after a fashion; read about how exciting that technology is at [tinyurl.com/qpjyu](http://tinyurl.com/qpjyu).)

If you 'refresh' an alkaline in this manner it'll definitely last significantly longer in low-drain



▲ Yeah, that ought to do it.



## I/O OTM wins a Logitech G5!

This is a mouse. We call it Fred. Sometimes Fred likes to eat cheese, but not really.



applications, like running a clock or a remote control. For most toys though, you probably won't even notice a difference in run time, especially if you don't refresh the batteries before the toy runs them flat.

Some hypothetical nanotechnological wonder could indeed recharge any primary cell, but this is about as easy as it is to turn urine back into beer.

You can minimise your battery expenses by buying rechargeables for high-drain devices (radio controlled cars, digital cameras), carbon-zinc (Super Heavy Duty) cells in bulk for low-drain toys, and possibly also off-brand alkalines in bulk for some of the toys in between. Bulk off-brand alkalines are far cheaper than Energizers or Duracells, and although they often have lower capacity – especially if the discount store bought up a bunch that are already three years old – the price per unit of energy remains far superior.

Of course, the very cheapest and nastiest alkalines, especially old ones, may leak. My easy-to-follow advice: Buy the cheapest cells you can find that don't.

## Can't find second gear

I've got three PATA hard drives in my PC (C, E and F; D is the DVD-RW), and one of them is really slow. Burning DVDs, for instance, works fine from C or F, but times out non-stop when the data is coming from E.

The drive wasn't using much CPU time when I accessed it, so I figured that the problem wasn't that it was stuck in PIO mode instead of DMA, but I still first looked in the BIOS setup to see if it wasn't set to DMA any more. But it was set to 'Auto' just like everything else, of course.

So I downloaded a S.M.A.R.T. data checking program, and that said that everything was OK, and I checked the drive for errors, and there weren't any, and I defragmented it, and the problem was still there.

Then I looked in the XP Device Manager and, lo and behold, the Secondary IDE Channel properties said there was a drive in PIO mode, even though the menu item right above it was still set to 'DMA If Available'.

WTF is going on, and how can I make it stop?

Adrian

**O** A surprising number of WinXP systems have this problem.

When WinXP's atapi.sys driver clocks up a total of six timeout or CRC errors for a given drive, it knocks that drive's communication speed down by one notch. If the errors are caused by a hardware that can't actually run as fast as it says it can (or just a lousy cable), this will solve them. If the errors are spurious, though, you can end up with a fast drive slowly ticking down the DMA modes, then into the dreaded PIO modes from days of yore. And it

will never come back up again, unless you fix it manually.

(You didn't notice much CPU use when accessing the drive, by the way, because modern CPUs are fast enough that non-DMA ATA modes no longer load them up significantly.)

What you have to do is run regedit (from Start -> Run...), then go to:

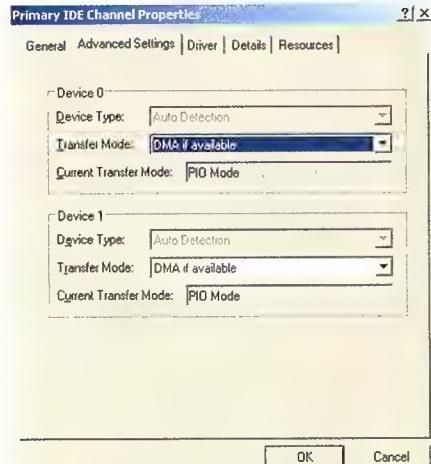
```
HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Control\Class\{4D36E96A-E325-11CE-BFC1-08002BE10318}\
```

Find the first of the 0001, 0002... entries that contains a 'DriverDesc' key whose value matches the name of the controller channel that's having the problem. In your case, that'd be the first one called 'Secondary IDE Channel'.

Now add a key called 'MasterDeviceTimingModeAllowed' or 'SlaveDeviceTimingModeAllowed', depending on whether the drive with the problem is a master or a slave, and set its hex value to 'fffffff'.

Now, when you go to the Device Manager

Properties window for that controller channel, set the device mode back to PIO and click OK, then open the window again and set the mode to 'DMA if available' and click OK again, and your drive should be back up to speed.



▲ I'm sorry if this picture gives you nightmares.

## I/O OF THE MONTH

### Shiver me timbers, crash me heads

**I**'m looking for a way to stop hard disk heads from crashing into the platter while a boat is afloat on heavy seas. I've yet to test this on a hard disk in operation but I think the disk would die a horrible death very quickly. I know that solid state disks are available, but they're too expensive for the enthusiast to consider.

So I thought – what about a suspension system to take the jolt out of hitting a swell?

I'm just wondering if any of the modders or *Atomic* staff have any ideas?

Could you use little hydraulic pistons or springs? There is also the problem of sea air affecting the PC, but one hurdle at a time...

Stephen Barwick

**O** Maybe, maybe not. Ordinary desktop drives certainly aren't built to take a lot of vibration.

Laptop drives, on the other hand, expect to be treated more roughly. Ordinary 2.5" laptop drives are also small enough compared to the 3.5" ones that if you mount them in a 3.5" bay there's plenty of room for padding, rubber-band suspension, or what have you. Obviously, you get even more room for suspension contraptions if you put a 2.5" drive in a 5.25" bay, or some even bigger enclosure.

If you completely mummify a drive in foam and then run it for extended periods it may overheat, but again, they expect worse treatment than desktop drives get, and don't need much cooling.

Laptop drives aren't terribly expensive any more either, especially if you can make do with a capacity of 80GB or less.

Off-the-shelf laptop-drive-to-3.5" mounting kits aren't likely to be useful to you, because they use rigid trays or rails that won't absorb any shocks. Those kits often come with a pin adaptor for the data and power cables, but you can buy those separately – they're all over eBay, and cheap, because they're just passive plug converters. Laptop PATA/SATA drives use the exact same data standards as desktop drives; they just have smaller connectors.

Note that there are a few laptops on the market these days (ThinkPads and MacBooks) that have their own accelerometer hardware, separate from the drive, which automatically clicks the drive into the parked-head position if the laptop thinks it's been dropped.

These laptops aren't, however, necessarily a good choice for boats, because when they're being bumped around all the time they don't let the drive run at all. You therefore have to turn the fall-detection feature off in the one situation where it'd be most useful.

It's also pretty easy these days to build a basic PC with no moving parts except fans, though if you want to run Windows you'll probably find Win98 is as far as you can go. Still, that's

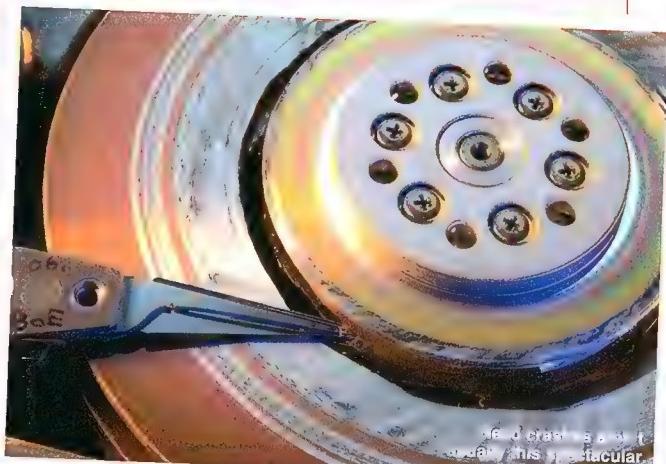
good enough for many purposes. You can use a modern motherboard if you like, and the gigabyte-plus CompactFlash cards to use as a system drive are now downright cheap.

Note that any shaking that'll bother a drive will also probably bother various other standard PC components – expansion slots, for instance, aren't made to tolerate constant jiggling. So putting the whole PC in some kind of shock-absorbing mounting could be an idea.

The cheapest version of this would, I think, be to use a standard laptop, but only when you're lying in your hammock.

#### GET IN TOUCH STEVE!

We'd like to send you your beautiful new Logitech mouse Steve, but unfortunately your email address doesn't work any more! Please drop the Editor a line at [lbooker@atomicmpc.com.au](mailto:lbooker@atomicmpc.com.au) so we can get you your mouse.



# ATOMIC HOTBOX

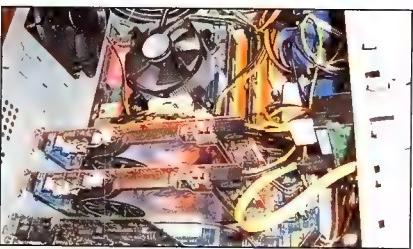
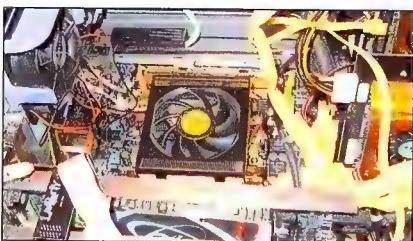
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## Adam's Junior & Beast



### technical details

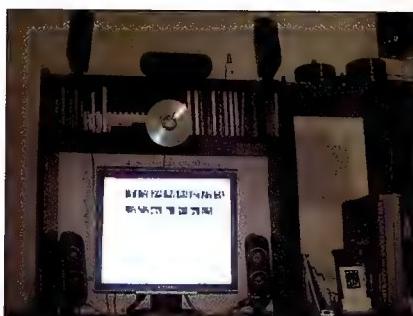
#### JUNIOR

- Pentium D 3.0GHz (dual core) and 1GB dual channel Kingston 533MHz DDRII
- 2x ATI RADEON X850 running CrossFire

#### BEAST

- AMD Athlon 64 x2 4800+ and 2GB dual channel OCZ EL DDR PC-4000 500MHz (CL 3-4-4-8)
- 2x XFX NVIDIA 7800 GTX SLI and DFI LanParty nF4 SLI-DR

## Dylan47's Perspex PC



### technical details

- Intel P4 3.0E GHz Prescott
- Foxconn 865A01-PE-6LS
- Gecube ATI RADEON 9600 PRO 256MB
- 2x 512MB Geil Dual-Channel
- Soundblaster Audigy 2
- 40GB HDD

## Matt's Green Machine



### technical details

- AMD Athlon 64 3000+ 1.8GHz @ 2.4GHz
- 1GB Geil RAM (2x 512MB)
- NVIDIA GeForce 6600GT
- 160GB and 40GB Seagate HDD
- Pioneer DVR-109 DVD writer
- Task crystal case

# hotbox OF THE MONTH

HOTBOX

## Defyant's Stealth'D

Stealth'D formerly known as HP-1 was the first in a series of ground up rebuilds. The case was originally a five-plus-year-old HP-Pav 8000 series case that housed an old Pentium II 400 PC. Stealth'D has come a long way since then and has undergone what is currently three full rebuilds.

A pic of the original case shows just how much different the case looks now. The old cacky grey case was completely pulled down and stripped back and the chassis was paint stripped and given a full pro two-pack auto paint job using GMH Monaro silver. The other panels were also sanded smooth, a window added to one side and a custom dual 80mm meshed side hole was added to the other.

*Defyant*



### technical details

- Pentium II 400
- 2x 74GB hard drives
- 2GB Geil RAM
- NVIDIA Quadro FX3400
- DD NV-68 GPU block & MPC-650 pump
- Matrix LCD



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and include the following:

- 3-4 high resolution, well lit, pictures.
- A 250-word description of how you made it, the obstacles you overcame, the tools you used, and your inspiration.
- A detailed list of the machine's specs.

Hotbox of the month wins a  
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- Intel Core 2 Extreme/ Core 2 Duo/Pentium D
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- Quiet 0dB cooling design
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- All-solid capacitors

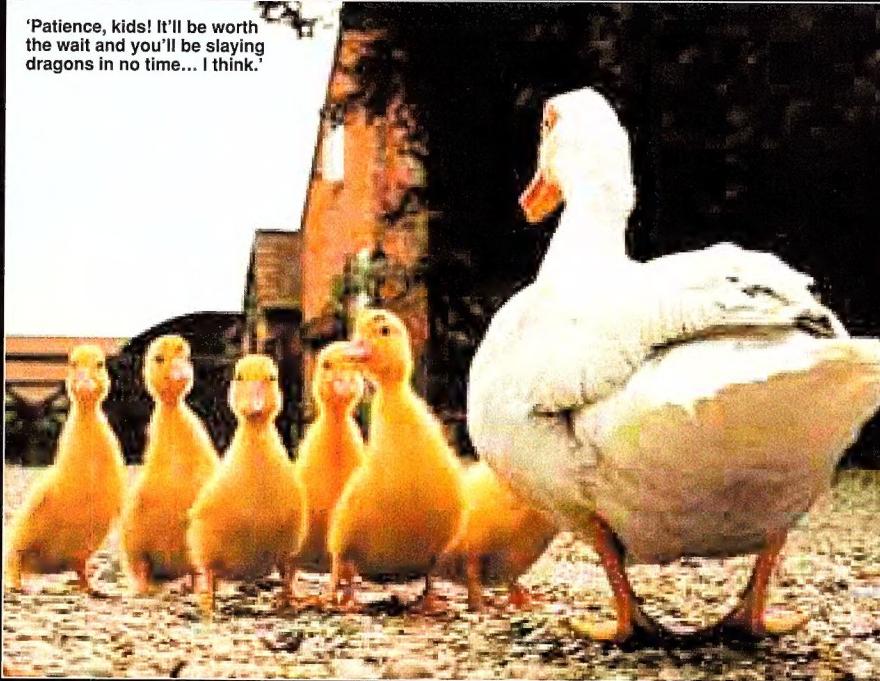
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# FALLOUT

Funnies and  
humour from the  
fallout zone



The IP's working title is Tech Demo and it features an extra type of brown.

## When it's undone

**Logan Booker** wants it done. He really does.

In a dungeon somewhere in Texas, John Carmack is working away on the next big thing since Quake. Or Doom. He's hammering away on a keyboard with cybernetic fingers, his original digits long since eaten away by years of non-stop typing and testing hydrogen rockets in his underdarks.

This dungeon however isn't much of a dungeon. More like a gorgeous, fluffy building made entirely of glass. Well, not entirely – there will be bits of concrete and plywood, and probably the soul of Cecil, the Demon Lord of Convection, eternally bound to the air-conditioning unit to keep it purring like a kitten, or screaming like a demon lord when it hasn't been fed enough kittens. It's probably above ground too. I'm also confident it's full of many, very expensive things like gold-coated

hammocks and dragons that breathe corn chips and sneeze salsa.

Anyway, Carmack is working away on the next big thing since Quack, that totally realistic 3D duck simulator that has you collecting bread in an attempt to seal a dimensional rift to the underworld. And id has said that this next big thing won't be a sequel to Quack, or Quake, or even Wolfenstein. Or that other game, Doom. It'll be something new, something entirely different.

Already rumours of this new IP have leaked onto the Web. So far, we know that the game's working title is Tech Demo and will feature exactly 32 percent more polygons, 12 more shaders and one extra type of brown than previous id games. As for the *actual content* of the game, well, the fanboy blogs are rife with

speculation, poorly animated GIFs and 16pt purple Arial.

DoomStein for example has you chasing a hellishly-disfigured German brewer across the open plains of Austria, in a valiant attempt to slay him using nothing but a stein of Krombacher and a set of suspenders.

Another, WolfQuake, requires you to take care of an old epileptic wolf whose dying wish is to watch you complete Q3DM6 using nothing but a rail gun.

Finally, an inside source has said that Raven Software has already licensed the new engine for its upcoming title Texan. Texan requires the player to start and successfully run their own game studio in Dallas. For Texan, Raven reportedly wants the focus to be on realism. As such, the player will have to deal with a number of factual disasters, and will include such scenarios as 'Crap Game Named After No-Dachi Synonym Angers Masses', 'Fire Big Name Over-hyped Lazy Designers' and 'Find Cash To Pay For Extremely Affluent and Completely Unnecessary Office Space in The JPMorgan Chase Tower'.

As usual, id has forecast 'when it's done' as the release date, once again sparking the debate on whether id should spend less cash on Doritos-disgorging dragons and precious metal sleeping paraphernalia and a bit more on calendars.

Even one would do.

### INSIDE JOINT TASK FORCE!

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NEXT MONTH

### RAID SUPERGUIDE

Construct your own RAID with the help of our resident RAID guy Craig Simms. Craig is also pretty handy with a rubber band.

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### MAC OS TWEAK GUIDE

Embrace the Mac! Tune the crap out of that pretty OS and give it some serious power.

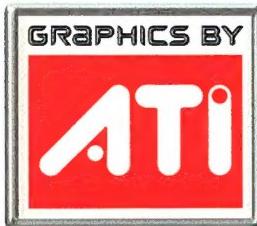
### AUSTRALIA EXCLUSIVE: WORLD OF WARCRAFT: THE BURNING CRUSADE

All the tasty details, straight from Blizzard's magical headquarters in Irvine, California. Exclusive info you won't find anywhere else on the biggest expansion since the Great Dividing Range!



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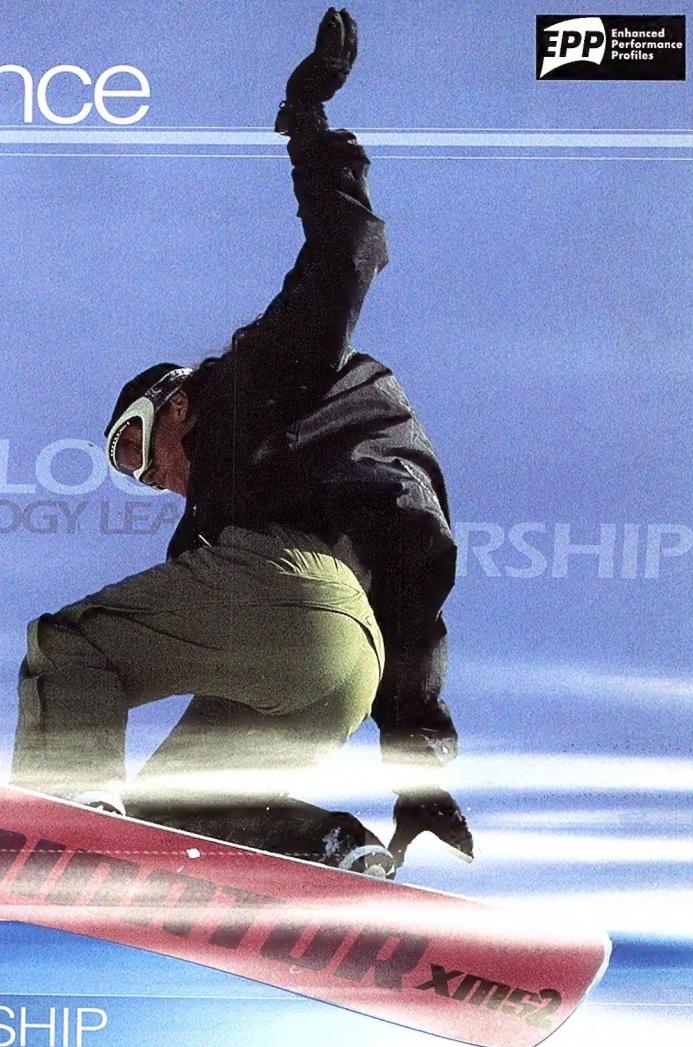
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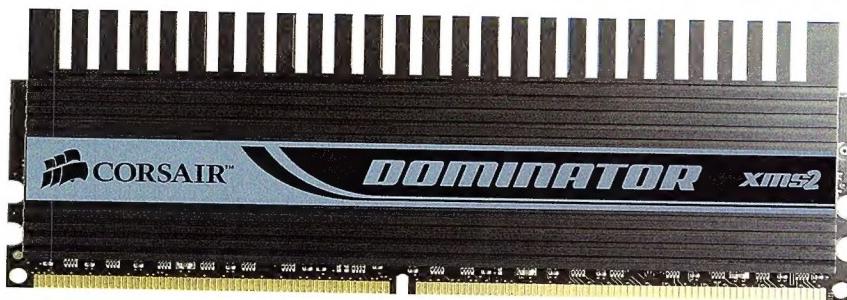


# cool performance

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